US Army Corps
of Engineers®
Walla Walla District

COPPEI CREEK FLOOD CONTROL PROJECT
WAITSBURG, WASHINGTON

DETAILED PROJECT REPORT AND ENVIRONMENTAL ASSESSMENT

October 2002

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SECTION 1.0 - INTRODUCTION

1.01. GENERAL.

The Mayor of Waitsburg, Washington sent correspondence to the U.S. Army Corps of Engineers (Corps), Walla Walla District, dated February 19, 1999, requesting assistance to develop a flood reduction plan for Coppei Creek. (See appendix A). He also requested the Corps coordinate/combine the Corps recommended flood reduction plan with the Washington State Department of Transportation's (WSDOT) plan to replace the U.S. Route 12 (U.S. 12) / WSDOT bridge designation 666 (Coppei Creek Bridge 12 / 666). In response, the Corps and WSDOT, the non-Federal designee for the Federal Highways Administration (FHWA), have developed this Detailed Project Report and Environmental Assessment.

A list of acronyms used in this Detailed Project Report and Environmental Assessment is found in section 11.

1.02. AUTHORITY.

This feasibility level Detailed Project Report and Environmental Assessment is being prepared under the authority of Section 205 of the Flood Control Act of 1948 (Public Law 80-858) and to meet the requirements of the National Environmental Policy Act (NEPA) of 1969.

The NEPA and subsequent implementing regulations promulgated by the Council on Environmental Quality (CEQ) require Federal agencies to evaluate the environmental impacts of proposed Federal actions and prepare written documentation of the analysis. This Detailed Project Report and Environmental Assessment documents whether the actions proposed by the Corps and the WSDOT / FHWA constitutes a " . . . major Federal action significantly affecting the quality of the human environment . . . " and whether an environmental impact statement (EIS) is required.

Section 205 of the Flood Control Act of 1948 provides the Corps authority to develop and construct small flood control projects without specific authorization from the U.S. Congress. In order for a Section 205 project to be constructed, a non-Federal Sponsor must be identified and a detailed study completed that shows the engineering and environmental feasibility and the economic justification for the project.

1.03. NON-FEDERAL SPONSOR.

The WSDOT is the non-Federal Sponsor for this feasibility level Detailed Project Report and Environmental Assessment (see appendix A, letter dated April 3, 2001).

The Waitsburg Coppei Flood Control District (WCFCD) will represent Waitsburg, Washington, as the non-Federal Sponsor for this Coppei Creek Right Bank Levee project. The WSDOT, South Central Region, will be a key project partner through a sub-agreement between the WCFCD and WSDOT.

1.04. PURPOSE AND NEED.

a. Project Purpose.

The purpose of the proposed project is to reduce flood damage in Waitsburg, Washington, that may result from a 1-percent chance exceedance flood from Coppei Creek and to replace Coppei Creek Bridge 12 / 666, while avoiding or minimizing adverse environmental impacts.

b. Project Need.

Past flood damage and public safety have precipitated a need for a flood reduction and bridge replacement project to minimize flood damages in the vicinity of Waitsburg, Washington.

Based on past flood flow regimes and the Corps economic analysis, a flood event on Coppei Creek that exceeds 1-percent chance exceedance flood could cause major damage to the City of Waitsburg.

c. Exclusion.

This report only considers flooding from Coppei Creek. Touchet River flooding and its associated damages were considered outside the scope of this report and, therefore, not addressed.

1.05. SCOPE OF WORK.

The purpose of this Detailed Project Report and Environmental Assessment is to identify and evaluate alternatives and select a preferred alternative for flood reduction and Coppei Creek Bridge 12 / 666 replacement in the City of Waitsburg. This feasibility level Detailed Project Report and Environmental Assessment provides a complete presentation of study results and findings based on engineering, economic, social, and environmental criteria.

1.06. <u>BACKGROUND (includes prior studies and reports)</u>.

a. <u>General</u>.

Waitsburg, Washington, is a small town surrounded by farming and other agricultural activities. It was established in 1865 and was granted a Territorial Charter in 1886, which predates Washington's statehood by 3 years. In 1996, the population of Waitsburg was approximately 1,000. The population continues to grow at a steady rate and, by some estimates, could double by 2020 (Baker, 1997, personal communication). The proposed project is located in Walla Walla County along the right bank of Coppei Creek, just south of Waitsburg, within Section 14, Township 9 North, Range 37 East on the Waitsburg quadrangle.

There are no stream gages on Coppei Creek; therefore, accounts of floods have been obtained from newspaper records, individual accounts, and similar sources. These accounts indicate there were two or three floods of sufficient size from 1960 to 1974 to cause considerable damage in the City of Waitsburg. More recently, in February 1996, a large flood occurred on Coppei Creek. This flood was estimated to have had an approximate 1.4-percent chance exceedance and an associated discharge of approximately 48 cubic meters per second (1,700 cubic feet per second). During this 1996 flood, an unquantified portion of Coppei Creek flowed over the right bank (looking downstream) through the Days of Real Sport fairgrounds, over U.S. 12, through a residential area, and ponded downtown in the Waitsburg, Washington, business district. All these floods that have been documented tended to be of short duration and were caused by either intense rainfall occurring on ground with high soil moisture content or by warm temperatures and rainfall on snow and frozen ground.

The proposed flood reduction project would preclude the type of flooding experienced in the past for the 1-percent chance exceedance flood and more frequent floods.

b. <u>Prior Studies and Reports</u>.

The *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report*, dated October 1997 evaluated flooding and flood damage reduction improvements in the Walla Walla River Watershed. The reconnaissance report was prepared under the authority of the resolution by the Senate Committee on Public Works adopted July 27, 1962 (Columbia River and Tributaries). The report established and documented Federal interest of recommended actions, based on preliminary costs, benefits, and environmental impacts.

The Reconnaissance Report identified two areas within the watershed where flood damage reduction projects were economically justified. One of the identified areas was Coppei Creek through the City of Waitsburg.

The *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report* proposed a levee project on Coppei Creek along only the right bank (looking downstream) of the creek. The recommended levee project assumed the Coppei Creek Bridge 12 / 666 would not be replaced; therefore, riprap protection of U.S. 12 was also anticipated.

Because the proposed levee project on Coppei Creek fits the qualifying criteria for the Flood Control Act of 1948, Section 205 (as amended), and the cost to the non-Federal Sponsor would be reduced (35-percent cost share versus 50-percent cost share under a General Investigation Program); a fact sheet was prepared requesting conversion of this project to a Continuing Authority Program, Section 205 authority. The Corps, Northwestern Division, approved the conversion giving notice to proceed with this feasibility level study.

SECTION 2.0 - PLANNING OBJECTIVE AND CRITERIA

The planning objective and criteria were developed from public meetings, consultations with the project sponsors, past reports, and the study team.

2.01. PLANNING OBJECTIVE.

The primary planning objective for this project is the reduction of flood damages to the extent practicable in the City of Waitsburg, Washington, along Coppei Creek. The Federal objective of any water and/or related land-resources project is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders, and other Federal requirements.

2.02. PROBLEMS AND OPPORTUNITIES.

The problems and opportunities associated with the proposed project were identified during public meetings, consultations with resource agencies, past reports/studies, current Coppei Creek condition evaluations, *etc.*

a. Problems.

Some of the significant problems in Coppei Creek through Waitsburg include the following:

- No adequate flood protection for the City of Waitsburg from high water events on Coppei Creek.
- Coppei Creek Bridge 12 / 666 has exceeded its life expectancy and is functionally obsolete.
- Diminished riparian habitat along Coppei Creek due to urbanization.
- Some of the fish species in Coppei Creek have been listed as threatened or endangered.
- Project implementation could cause flooding in areas not previously flooded.
- Coppei Creek deposits material at the bridge, thus reducing water passage under the bridge.

b. Opportunities.

There are opportunities associated with a setback levee along the right bank (looking downstream) of Coppei Creek to do the following:

- Reduce flood damage to the City of Waitsburg from Coppei Creek.
- Improve the bridge structural integrity and eliminate the flow constriction.
- Expand and re-establish a riparian zone along Coppei Creek through Waitsburg.
- Improve fish habitat in portions of Coppei Creek.
- Increase protection to Waitsburg properties listed on the National Register of Historic Places.

2.03. PLANNING CRITERIA.

A wide range of criteria was considered that would reduce flood damages by providing a 1-percent chance exceedance flood protection from Coppei Creek to the City of Waitsburg in Walla Walla County, Washington. These planning criteria were used to screen and evaluate each viable alternative plan's contribution to National Economic Development (NED); Environmental Quality (EQ); Regional Development (RD); Other Social Effects (OSE); and Operation and Maintenance (O&M). Planning criteria for the study are presented in the following paragraphs.

a. National Economic Development Criteria.

The NED criteria are used as a guide in formulating alternative plans that meet the planning objective while maximizing net benefits to the Nation. The pertinent NED criteria used in these studies include the following (this is detailed in section 5.0, Economic Evaluation):

- Reduce flood damages to the extent practicable within the City of Waitsburg.
- Use the Congressionally mandated Federal interest rate to determine annual costs and discount future benefits (currently 6.375 percent).
- Use a 50-year project economic life to evaluate flood damage reduction plans.

- Include in the calculation of average annual costs the interest and amortization of construction costs and provision for annual maintenance, operation, and major replacement.

- Measure economic efficiency of alternative plans by net benefits (*i.e.,* total annual benefits, minus total annual costs, equals net benefits).

- Maximize net benefits.

- Each plan must be complete within itself and include all actions necessary to realize its economic benefits under a range of reasonable future economic conditions.

b. Environmental Quality Criteria.

The EQ criteria that follow consist of ecological resources-related opportunities and constraints applied to each alternative to maximize the contribution to environmental quality. Also included in the evaluation criteria are each alternative plan's effect on endangered species, vegetation, water quality, air quality, and the floodplain.

- Maintain the passage of anadromous fish in Coppei Creek and its tributaries.

- Preserve anadromous and resident fish spawning and rearing areas in the study area.

- Preserve the intermittent, shallow water areas and riparian zone, overstory, and wetland vegetation critical to resident and migratory fish and wildlife.

Alternatives that do not impinge upon the existing Coppei Creek channel and that minimize impacts to the riparian zone would significantly reduce potential problems dealing with EQ.

c. Regional Development Criteria.

The following RD criteria include opportunities related to increased economic efficiency within the study area (or region), but do not necessarily benefit the Nation as a whole.

- Protect the City of Waitsburg from flooding of Coppei Creek.

- Contribute to the overall community development by a reduction of the depressing economic effects of flood damages to the extent practical in the study area.

d. Other Social Effects Criteria.

The OSE/Human Communities criteria listed below include those engineering policy standards that are applied to all alternatives to assure the maintenance of public health and safety related to the well being of people. Also included is the preservation of past and present human resources.

- Enhance the quality of life in the study area by reducing the fear of flooding for those in the floodplain and reducing the risk of injury due to floods.

- Avoid significantly increasing flooding in unprotected areas.

- Avoid to the extent possible relocation of public facilities and properties and the resulting inconvenience to residents during construction.

- Maintain aesthetic values within the study area.

- Preserve cultural resources.

- Improve the safety of the traveling public.

e. Operation and Maintenance.

Once the project has been constructed, O&M requirements for the levee, floodwall, and appurtenances would be managed by the WCFCD. The O&M requirements would include, but not be limited to, the following:

- Maintain newly constructed structures.

- Maintain vegetation that is planted as part of the project.

- Remove shrubs and blackberries that would obscure the condition of the project.

- Maintain gates, culverts, and other facilities associated with the project.

- Correct damage to the project that results from pedestrians, rodents, livestock, and/or vehicles.

Operation and maintenance for the U.S. 12, Coppei Creek Bridge 12 / 666 will be by the WSDOT.

SECTION 3.0 - PLAN FORMULATION AND EVALUATION OF ALTERNATIVES

Plan formulation for this project began when Coppei Creek through Waitsburg was identified as a flood damage reduction project in the *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report* (available upon request). After this project was transferred from the General Investigation Program to a Continuing Authority Program, Section 205, a more thorough formulation of the planning process took place.

The Corps and WSDOT held a public scoping meeting at Ye Towne Hall in Waitsburg on October 27, 1999. Approximately 35 people attended the meeting. The purpose of the meeting was to provide an opportunity for interested parties to ask questions and identify concerns regarding the proposed project. The Corps and WSDOT made brief presentations, followed by a question and answer period. Meeting attendees identified 17 concerns and ranked them in order of importance. A complete summary of the meeting is included in appendix A.

On June 4, 2001, a second meeting was held in Waitsburg for the purpose of discussing local views regarding the historical significance of the Coppei Creek Bridge 12 / 666. The general consensus was that the Coppei Creek Bridge 12 / 666 is historically significant to the City of Waitsburg, but is not listed on the Washington State Historic Highway Bridges list. However, flood reduction is also very important.

In addition to the above-mentioned public meetings, Washington Department of Fish and Wildlife (WDFW), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the Washington Department of Ecology (DOE) have provided input to this proposed action. This input was partially during the reconnaissance phase for the *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report.*

Information regarding the proposed project was obtained from meetings for the *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report* and/or phone conversations with other resource agencies, the non-Federal Sponsor, and attendees of the public meetings. Based on this information, general criteria were established for the planning objective, problems, opportunities, and constraints. Both structural and nonstructural alternatives were identified that generally addressed the planning objective while considering the planning criteria.

3.01. EXISTING CONDITIONS.

In 1996, the population of Waitsburg, Washington, was approximately 1,000. It continues to grow, as does the majority of Walla Walla County. Several buildings located in downtown Waitsburg are listed on the National Register of Historic Places.

a. Stream and Drainage Area.

Coppei Creek originates in the Blue Mountains, southeast of Waitsburg. The north and south fork join and roughly parallel U.S. 12 northward to Waitsburg, where it passes under the Coppei Creek Bridge 12 / 666. The Creek then flows along the southern perimeter of Waitsburg, traveling west until its confluence with the Touchet River at the northwest end of Waitsburg. Waitsburg is located on the alluvial fan created by the confluence of the Coppei Creek and the Touchet River. Flooding on alluvial fans is characterized by high velocity flows, active processes of erosion, sediment transport and deposition, and unpredictable flow paths. Coppei Creek drains 95.8 square kilometers (37 square miles) with the total length of the drainage above Waitsburg at approximately 26 kilometers (16 miles). Elevations within the Coppei Creek basin range from 368 meters (1,208 feet), National Geodetic Vertical Datum 1929 (NGVD 29) to 1, 354 meters (4,442 feet) NGVD 29.

b. Existing Flood Control.

Structural flood hazard mitigation measures within Waitsburg are limited to those constructed by local interests or by Federal agencies under emergency conditions. These are considered neither permanent nor adequate to provide 1-percent chance exceedance flood protection.

c. Climate.

The climate of the Touchet River basin, which includes Coppei Creek, is characterized by moderate mean annual temperatures but relatively large variations in temperature, low to moderate precipitation, moderate winds and sunshine, and low to moderate humidity. In general, this climate is subject to the moderating influence of prevailing westerly flow of maritime air from the Pacific Ocean, but occasional influxes of polar air masses cause brief periods of extremely cold weather.

d. Temperature.

Temperatures within the Touchet River basin exhibit a large seasonal variation with maximum temperatures rising well above 37.8 degrees centigrade (°C) [100 degrees Fahrenheit (°F)] in the summer and a minimum temperatures falling below –17.8 °C (0 °F) in the winter.

e. Precipitation.

Moist maritime air masses moving inland from the Pacific Ocean deliver most of the precipitation in the Touchet River basin in the late fall, winter, and spring months, but are rare in the summer months. This causes a large seasonal variation in the precipitation within the basin with less than 13 percent arriving in the period June through August. Summer precipitation is usually the result of convective activity in the

mountainous areas. Although the local intensity of these thunderstorms can be quite high, the precipitation accumulation is normally small.

f. Existing Bridge.

The Coppei Creek Bridge 12 / 666, which is part of U.S. 12, is located within the proposed project area. The bridge was originally constructed in 1920 by the Union Bridge Company. Since its original construction, the sidewalks of the bridge have been paved over to provide wider traffic lanes. The bridge has exceeded its life expectancy and is structurally obsolete. For many years, the local residents would clear the debris and sediment that collected under the bridge. Recently this practice has been abandoned.

3.02. FUTURE WITHOUT-PROJECT CONDITIONS.

The City of Waitsburg regularly experiences significant flooding. These flood events normally result in short sections of levees being constructed under emergency situations. Although this helps, it does not provide continuous protection for Waitsburg from Coppei Creek flooding. Without this Section 205 project, Waitsburg will continue to experience flooding from Coppei Creek at great financial cost which will continue to threaten the safety of the local residents and endanger the integrity of several buildings in downtown Waitsburg (some that are listed on the National Register of Historic Places).

Continued flooding from the Coppei Creek comes at great financial expense. Not only to the City of Waitsburg, but also to the State of Washington, Walla Walla County, and the Federal government. When a major flood event occurs, all available resources are activated.

During a flood event in the Waitsburg area, public safety is a major concern. Because Waitsburg is a small rural area, the roadways are the only access to the area, other than emergency helicopter. Either Coppei Creek or the Touchet River borders the town on all sides. The Waitsburg sewage treatment plant is located adjacent to the Touchet River, just west of town. The sewage treatment plant was compromised during the 1996 flooding. Damage to the plant causes waste to enter the Touchet River, adversely affecting communities and residences located downstream. Additionally, during the 1996 flood, 200 of the 500 homes in Waitsburg were flooded, threatening the safety of the local residents.

3.03. PLANNING CONSTRAINTS.

Planning constraints associated with reducing flood damages in the City of Waitsburg are the proximity of residential homes to Coppei Creek, the presence of fish species listed as threatened or endangered, and the existence of the Coppei Creek

Bridge 12 / 666, which is part of U.S. 12. Additionally, some ponding of floodwaters may occur. These constraints significantly limited viable alternatives.

3.04. ALTERNATIVES CONSIDERED FOR THE PROPOSED ACTION.

Initially, several flood damage reduction plans were considered, as well as a "no action" alternative. This wide range of alternatives was developed from recommendations received at public meetings held in Waitsburg; plans identified in the *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report*; recommendations from other resource agencies; and brainstorming by the study team members.

3.05. ALTERNATIVES REMOVED FROM FURTHER CONSIDERATION.

A number of alternatives were screened from further consideration early in the process. Costs, real estate considerations, and fish/wildlife habitat impacts were deciding factors in eliminating the alternatives listed below.

- Channel dredging.
- Storm water retention reservoirs.
- Flood warning systems.
- Flood bypass channel.
- Real estate purchases.
- Establishment of new floodplain boundaries for regulation of future development.
- Concrete channel.

Channel dredging would remove sufficient material to provide adequate flow capacity within Coppei Creek, but would have other undesirable effects such as creation of steep banks, destruction of existing vegetation, and removal of the natural armor in the bed of the stream. This option would also require periodic dredging to maintain the flow capacity. Negative environmental impacts of this alternative, including impacts to species listed under the Endangered Species Act (ESA), would be unacceptable.

Storm water retention reservoirs have effectively controlled flood events at other locations, but typically have a high cost and require a large footprint area to provide enough storage capacity to be effective. An appropriate location for a retention reservoir would be impossible to find without driving the project cost to an

unacceptable amount. The budget constraints of the project sponsors eliminated this alternative from further consideration.

Flood warning systems could help people prepare for a flood fight or evacuation, but most likely would not prevent damage to property.

Construction of a flood bypass channel would require consideration of both property issues and hydraulic limitation. In early surveys of the project area, no workable alternative route could be identified.

The purchase of real estate to reestablish a floodplain would provide a way to handle flood flows in a natural manner. The 1996 flood event showed that the required real estate purchases would involve a significant portion of the town (including public schools). Therefore, purchase of real estate was deemed unreasonable.

Establishing new floodplain boundaries would control new development in the floodplain, but would not reduce the damage to existing structures during a flood event. It was the "avoided damages" that provided justification for this project and, therefore, adjustment of floodplain boundaries was deemed an ineffective method of control in this scenario.

A concrete channel would not meet environmental requirements, nor would it eliminate the need for some levee construction to direct flows into the channel. Additionally, the cost to construct such a channel would be prohibitive. For these reasons, this alternative was removed from further consideration.

3.06. ALTERNATIVES SELECTED FOR FURTHER EVALUATION.

Only construction alternatives that were judged to be feasible from a social, economic, engineering, hydrologic, and environmental standpoint were selected for further evaluation. These alternatives include a levee setback from the creek, a levee parallel to the creek, and "no action."

a. Alternative 1, Setback Levee – Preferred Alternative.

Alternative 1 would consist of two setback levees (levees 1 and 2) and two Floodwalls (walls 1 and 2) constructed on the Coppei Creek right bank and a new Coppei Creek Bridge 12 / 666 at the U.S. 12 crossing. Reference sheets 1 through 7. Levee 1 would extend from just south of Seventh Street for about 244 meters (800 feet) to just east of U.S. 12 where it would terminate at high ground. Floodwall 1 would begin at high ground and extend approximately 121.9 meters (400 feet) to the northwest abutment of U.S. 12. Floodwall 2 would begin at the northeast abutment of the Coppei Creek Bridge 12 / 666 and extend 141 meters (461 feet) through a constricted area and connect to levee 2. Levee 2 will run at an offset to the creek, south of the racetrack, and terminate some 640 meters (2,100 feet) east at high ground.

The proposed levees are 3.1 meters (10 feet) wide on top and have 1V:3H side slopes. The slope would be designed with reinforced-turf-mat and vegetated to provide protection during design flows. The levee would be constructed with a riprap toe to protect against scour.

Replacement and relocation of the Coppei Creek Bridge 12 / 666 would complete the flood protection by providing greater flow-through capacity for Coppei Creek at the bridge.

b. Alternative 2, Parallel Levee.

Alternative 2 is the same as alternative 1 except that a portion of levee 1 would be realigned to more closely parallel with Coppei Creek (Reference sheet 3). The realigned portion of levee 1 is identified as levee 3. Levee 3, 482 meters (1,582 feet) long, would, like levee1, begin on the right bank at the floodway edge near Seventh Street. It would approximately parallel the right bank of Coppei Creek for about 482 meters (1,582 feet) until its connection with the levee 1 alignment. The remainder of the levee length extends parallel with Coppei Creek connecting with high ground in the same area as alternative 1.

This alignment is longer than alternative 1 and fails to make use of existing high ground, thus making it more expensive than alternative 1. Additional lands protected by this alternative are agricultural and not economically justified by the additional cost of this alternative.

c. Alternative 3, No-Action (Without Project).

The "no action" alternative provides a baseline for comparison to other alternatives. Under the "no action" alternative, the bridge and floodplain would be left as they are, resulting in continued flooding from periodic high-flow events on Coppei Creek. Emergency flood fighting/sandbagging efforts would be expected to continue. However, damages might not be reduced, resulting in a continuation of average annual flood damage costs of approximately $286,000 in the study area. Additionally, emergency efforts to control flooding could include activities that damage the riparian areas adjacent to the stream.

3.07. ALTERNATIVE ANALYSIS.

The contributions of the three alternatives to NED, EQ, RD, and OSE accounts listed in *Principles and Guidelines*, published by the U.S. Water Resources Council, were evaluated using an alternative comparison matrix, a flood frequency analysis, and a hydraulic analysis.

a. <u>Alternative Comparison Matrix</u>.

The two-part matrix system was used to evaluate and rank the feasible alternatives with the objective to determine which alternative offered the greatest potential and the lowest risk. The first matrix (figure 3-1) was used to determine the relative importance of the evaluation criteria. Each criterion was weighted against each of the other criterion; first by its importance (which criterion was more important than the other) and second by the numerical difference between the criteria (how much more important than the other). Numerical differences ranged from 0, no difference, to 5, indicating a major difference between two criterions. The summation of the numerical differences for each criterion (vertically and horizontally across the matrix) provided a numerical score for each criterion.

The second matrix (figure 3-2) was used to compare each alternative against the criteria evaluated in the first matrix. Determining how each alternative met the individual criterion completed this matrix. Numbers from 5 (excellent) to 1 (poor) were used to describe each alternative as it relates to each of the criterion. Each criterion meeting number was multiplied by the weighting score for that criterion to determine a value. The alternative with the highest total had the greatest preference and was selected as the best alternative.

Figure 3-1. Alternative Comparison Matrix 1 – Weighting Criteria.

CRITERIA:

A - **Flood Protection (Purpose and Need)**

B - **Implementation Cost**

C - **Operations & Maintenance**

D - **Ecological Resources (includes ESA, vegetation, water quality, air quality, and floodplain)**

E - **Other Social Effects (includes cultural resources, social effects, public services, aesthetics, and noise)**

F - **Traffic Safety**

G - **National Economic Development**

H - **Land Use/Ownership**

(SUM of Scores in Both Vertical and Horizontal)

	B	C	D	E	F	G	H	I	J	K	SCORE	ORDER
A	A 3	A 2	A 2	A 1	A 1	A 3	A 2				A's 14	HIGH
B		B 2	D 1	E 1	F 1	B 2	B 4				B's 8	
C			D 5	E 4	F 5	C 2	C 3				C's 5	
D				E 0	F 0	D 3	D 4				D's 13	
E					F 2	E 4	H 0				E's 9	
F						F 4	H 4				F's 12	
G							H 1				G's 0	
H											H's 5	
I											I's 0	
J											J's 0	
K											K's 0	

	F	G
E	? ?	? ?

PREFERENCE WEIGHTING

0 - No Difference

1 - Minor Difference

2 -

3 - Medium Difference

4 -

5 - Major Difference

Figure 3-2. Alternative Comparison Matrix 2.

List the best ideas from ranking and comparisons techniques. Determine which one stacks up best against desired criteria.

Excellent - 5
Very Good - 4
Good - 3
Fair - 2
Poor - 1

CRITERIA:

DESIRED CRITERIA

A - **Flood Protection (Purpose and Need)**
B - **Implementation Cost**
C - **Operations and Maintenance**
D - **Ecological Resources (includes ESA, vegetation**
E - **Other Social Effects (includes cultural resources**
F - **Traffic Safety**
G - **National Economic Development**
H - **Land Use/Ownership**

	A	B	C	D	E	F	G	H	I	J	K	Totals
Wt. From Crit. Matrix:	14	8	5	13	9	12	0	5	0	0	0	
1 Levee Setback From Creek	*5* 70	*4* 32	*4* 20	*4* 52	*5* 45	*5* 60	*4* 0	*2* 10	*0* 0	0	0	289
2 Levee Parallel to Creek	*5* 70	*3* 24	*4* 20	*2* 26	*4* 36	*5* 60	*3* 0	*4* 20	*0* 0	0	0	256
3 Present No Action	*2* 28	*5* 40	*5* 25	*5* 65	*1* 9	*2* 24	*1* 0	*3* 15	*0* 0	0	0	206

b. Flood Frequency Analysis.

Since there are no systematic discharge records available for Coppei Creek, discharges for the flood frequency analysis were computed for selected probabilities using a regional analysis that consisted of relating basin characteristics to streamflow characteristics. The discharge and associated exceedance probabilities are the same as those published in the study by the Federal Emergency Management Agency, *Flood Insurance Study, City of Waitsburg, Washington, Walla Walla County,* dated May 3, 1982.

c. Hydraulics Analysis.

To ascertain base information for the hydraulic evaluation of the proposed project, 29 valley sections and 5 bridge details with associated bridge cross-sections were surveyed. Information was also used from the Corps, Walla Walla District, April 2001 study, *Floodplain Management Services, Special Study, Coppei Creek, City of Waitsburg and Walla Walla County, Washington.*

The Hydrologic Engineering Center's (HEC) Computer Program entitled, "Water Surface Profiles," Version 4.6.2, commonly referred to as "HEC-2," was used to compute the water surface profiles for the 10-percent, 2-percent, and 1-percent

chance exceedance floods and floodway for the existing condition and the with-project condition. To determine the 0.2-percent chance exceedance floodplain downstream of Meinburg Road, the Federal Emergency Management Agency's computer program "FAN, An Alluvial Fan Flooding Computer Program," dated September 1990, was used. This program is used to predict flood depth and velocity zones. The FAN program uses the annual peak discharge frequency curve statistics for input. The FAN program input is derived for the 0.2-percent chance flood as follows: The annual peak discharge frequency curve for Coppei Creek is translated horizontally so that the discharge associated with the 0.2-percent chance exceedance probability is relocated and corresponds to the 1-percent change exceedance discharge. The statistics of the translated frequency curve are then used as input to the FAN program.

The two levee alignments were chosen to both minimize impacts to residents in the project vicinity (while minimizing the amount of undeveloped land protected by the project) and avoid impacts to the environment, while providing for the collection of interior runoff during floods.

The alternative 1 levee alignment was first evaluated using the HEC-2 hydraulic model to determine the levee height and evaluate the impacts (ponding) to adjacent lands. Alternative 2 was abandoned before hydraulic modeling was completed due to the larger project cost of this alternative.

SECTION 4.0 - RECOMMENDED PLAN

4.01. SELECTION OF THE RECOMMENDED PLAN.

The analysis of the alternatives indicates that Alternative 1, Setback Levee, is the preferred alternative. The recommended plan consists of levees that are offset from the north (right) bank of Coppei Creek (see sheets 2 and 3). It would provide protection from the 1-percent chance exceedance flood, thereby, reducing flood damage to the City of Waitsburg. Alternative 1 incorporates elements that increase public safety while maximizing techniques that would avoid adverse impacts to the environment. Alternative 1 is the recommended plan that meets the economic, engineering, and environmental requirements and the non-Federal Sponsor's needs to the greatest extent practical.

4.02. NATURAL FEATURES.

The topography around the proposed project area is generally a flat valley bottom consisting of depositional materials. This is typical of the alluvial fan created by the confluence of the Touchet River and Coppei Creek.

The *Soil Survey, Walla Walla County Washington,* issued in February 1964 by the U.S. Department of Agriculture, Soil Conservation Service, provides the following information on the drainage area and soil types. The drainage pattern is controlled mainly by the surface of the underlying basalt. Stream gradients are determined by the tilt of the basalt; they are high, generally more than 15.2 meters per kilometer (50 feet per mile). Most streams are cutting their beds to grade across exposures of basalt bedrock. During high water, all streams carry excessive loads of silt.

The soil type along the proposed Coppei Creek project is an onyx silt loam. It is described as a deep, well-drained, medium-textured soil formed in recent alluvium from loessal uplands that occurs on wide bottoms of streams and rivers. The soil is low plastic silt with a low shrink-swell potential. This material is at least 1.8 meters (6 feet) thick; below that, one may expect gravel, loess, or basalt rock. The average depth to the seasonal high water table is 2.1 to 2.4 meters (7 to 8 feet). These soils are good to fair for dike or levee construction. Further investigations of the foundation materials will be planned along the alignment of the proposed levee during the design phase of this project.

4.03. DESIGN FEATURES.

a. General.

The recommended plan consists of five principle components: two separate sections of earth embankment levee (levees 1 and 2), two floodwalls (walls 1

and 2), and replacement of the Coppei Creek Bridge 12 / 666. The levee alignment, set off the north bank of Coppei Creek, was designed to avoid environmentally sensitive areas while minimizing construction and real estate costs. Measures taken to avoid/ minimized impacts included placing the levee as far away from the riparian zone as practicable and building on the city easement that is located south of the fairgrounds, as much as practicable. Floodwalls were incorporated at locations where space is limited, specifically they would extend 121.9 meters (400 feet) upstream and downstream of the bridge. The new bridge would tie into the concrete floodwalls. The bridge replacement would be constructed to meet current WSDOT/ FHWA bridge design standards.

b. Levee Embankment.

The levees would be located within the boundaries of the 1 percent chance exceedance flood, but outside the footprint of the floodway (see sheets 1 through 7). The levee embankments would be located a minimum of 7.6 meters (25 feet) away from the main channel of Coppei Creek or as far away from the stream as possible. The intent of constructing the levee would be to reduce flooding and guide the north side of the stream when high velocities are experienced. The levee embankment would be constructed by using silty sand and cobble soils. The typical embankment levee section would have a 3.1-meter (10-foot) top width with 1V:3H side slopes that would have 15.2 centimeters (6 inches) of topsoil. The 1V:3H side slopes were designed for easy grass cutting and maintenance. Erosion protection for the levee was designed to provide adequate protection to the levee while blending into the natural environment of the rural area (see sheet 4). As a result, the grassed slope of the streamside of the levee would be protected with a high performance turf reinforced mat. The mat would be covered with 7.6 centimeters (3 inches) of topsoil and the area seeded. The toe of the riverward side of the levee would be protected with an additional .457 meter (1.5 feet) of riprap in case of scour at locations where erosive velocities could occur. It is possible over time that the stream will meander toward the levee causing impingement points at some locations. Additional erosion protection may be needed during the project life. Also, there is a chance that the turf reinforcement mat might be damaged from debris during high flows. However, because the levee would setback from the mainstream channel, it is not anticipated that large debris would significantly impact the levee.

c. Interior Drainage.

Coppei Creek Bridge 12 / 666 drainage will flow north into the U.S. 12 storm drain system. It is anticipated that some surface drainage from seasonal storm runoff may collect landward of the proposed levee and floodwalls. If this surface drainage were significant enough to cause ponding, drainage facilities would be incorporated into the project. Provisions for handling runoff will be thoroughly evaluated during detailed design. If it is determined that drainage facilities are needed,

they may include drainage ditches, culverts, *etc.*, as necessary to redirect the runoff away from the levee.

d. Levee 1 and Floodwall 1.

Reference sheets 3 and 5. The west end of levee 1 would be 530.9 meters (1,742 feet) long and would begin at station 0+00 on the floodway edge near Seventh Street. It would extend east for about 76.2 meters (850 feet) and then south following high ground near residential property lines for about 106.7 meters (350 feet). Levee 1 would then extend parallel to Coppei Creek for another 165.2 meters (542 feet) connecting with high ground. Floodwall 1 is 121.9 meters (399 feet) and would extend east from high ground to the west side of U.S. 12. Floodwall 1 would connect to the north abutment of the Coppei Creek Bridge 12 / 666. Levee 1 would vary in height from 0 to 2.4 meters (0 to 8 feet). Floodwall 1 would vary in height from 0 to 2.1 meters (0 to 7 feet).

The floodwall would be constructed out of reinforced concrete. It would require a concrete footing 2.4 meters (8 feet) wide and 0.61 meters (2 feet) thick for support. The footing would be constructed behind the floodwall (*i.e.*, farther from the creek than the floodwall itself). This footing would be buried with topsoil to a depth of 0.3 meters (1 foot), leaving about 1 meter (3.3 feet) of floodwall exposed above the ground. A toe wall would be constructed to protect the floodwalls against erosion in the event of a flood. The placement of the floodwalls would require the removal of several trees, but would leave a majority of the riparian area intact. After construction is complete, the disturbed ground would be revegetated with native trees and grasses.

e. Bridge Replacement.

Bridge and traffic approach replacement may include construction of a temporary bridge and approaches to the east or west of the existing bridge, or may involve alternative routes for traffic that will be determined later in the design phase. It would also include the removal of the existing bridge, installation of the new bridge, and removal of the temporary bridge and approaches, if applicable.

The WSDOT Bridge Office will design both the temporary and new bridges. The bridges will meet current WSDOT/FHWA standards. Both bridges will span the entire stream without disturbance below the ordinary high water line. The temporary bridge would cause no more restriction to flow than the existing bridge. Several trees and some riparian vegetation on private property would have to be removed in order to clear enough ground for the temporary bridge footprint. No excavation would be required to support the temporary bridge. Instead, geotextile material would be folded over layers of gravel to create a series of material lifts that would support the bridge (see sheet 7). This method would take relatively little time and minimize impacts to the riparian area while avoiding in-water work.

Removal of the existing bridge would be negotiated with the permitting agency and would include conditions. Several requirements must be met:

- The existing bridge would be removed in as few pieces as possible with heavy equipment.

- The bridge foundation/footings should be removed to approximately 0.31 meter (1 foot) below creek bed as approved by the permitting agency.

- All pieces of the bridge would be removed using vertical free suspension; no piece of the bridge would be dragged through the streambed.

- Bridge removal would take place within the approved work window as designated by WDFW. It is anticipated that this work window would be between July 15 and ending Sept 30.

The new bridge width will meet current WSDOT/FHWA standards and match the proposed floodwalls. The opening under the bridge would be wide enough to pass the 1-percent chance flood with 1 meter (3 feet) of freeboard to pass debris. It would span the creek with no piers in the channel. The bridge approaches would also be placed to properly align with the new bridge. The new bridge abutments would be constructed of reinforced concrete. Fresh concrete or water containing fresh concrete would not be allowed in contact with the stream. Construction of the new bridge includes placement of material below the ordinary high water line. All work below the ordinary high water line would be completed before the end of the approved work window. Some riprap may be placed next to the new bridge abutments to protect them against erosion.

In order to protect the stream from damage by construction activities, a geotextile fabric may be secured to the ground below and around the bridge to contain any debris during construction. The fabric would be placed in the streambed, and the stream would flow directly over the top. Alternately, a culvert may be installed for the duration of in-water work, or other alternatives using best management practices. During removal of the bridge abutments, the streamflow would need to be rerouted through the construction area in order to separate excavation and placement of material from flowing water. The installation of a culvert would accomplish this, as would rerouting of the stream with sandbags. After construction is complete, the streambed would be returned to its previous condition and the disturbed ground revegetated with native trees and grasses. Removal of the existing bridge would include excavating material from within the ordinary high-water mark. The WSDOT will negotiate bridge construction permit conditions with resource agencies, but WSDOT will use the 404 permit obtained by the Corps.

f. Levee 2 and Floodwall 2.

Reference sheet 4. Floodwall 2 would be constructed in the same manner as described for floodwall 1 in section 4.03 d., paragraph 2. It would run for 140.5 meters (461 feet) and begin at its connection with the Coppei Creek Bridge 12 / 666 north abutment, station 0+00. Floodwall 2 would extend east through the constricted area and connect to levee 2. Floodwall 2 would vary in height from 0 to 1.8 meters (0 to 6 feet). Prior to construction of the floodwall, the berm immediately upstream of the bridge would be leveled. This berm is made of gravel, earth fill, and riprap. The berm sits directly adjacent to the creek, but has no subsurface structure. The top of the berm (the portion of the berm that is of higher elevation than the ground directly behind it) would be removed using heavy equipment. The berm has been pushed up around several large trees, which would be left in place, and the riprap would be pulled out from around them. Any riprap below the ordinary high-water mark would be left in place to minimize disturbance to the stream.

Levee 2 would be 649.8 meters (2,132 feet) and begin at the east end of floodwall 2 and extend southeast along the north bank approximately paralleling Coppei Creek to near station 9+00. At that point, levee 2 would turn east and connect to high ground at the hillside just east of the south end of the fairground's racetrack. Levee 2 would vary in height from 0 to 3.0 meters (0 to 10 feet).

g. Staging Areas.

Three staging areas would be used to store materials and equipment during levee and bridge construction. The staging areas are shown in appendix D, plate D-A-19. After the project has been completed, the staging areas would be returned to a state similar to the pre-project condition.

4.04. REAL ESTATE.

Twelve (12) private ownerships would be affected by the proposed project. For the areas to be crossed by the levee itself, it is recommended that standard flood protection levee easements be acquired. Channel improvement easements are recommended for those areas of the alignment involving concrete setback walls. To facilitate project staging and construction, temporary work area easements would be necessary at three strategically located sites. The flood protection measures would cause inundation of a small area during high water events. This would require the acquisition of a standard flowage easement (occasional flooding). Lastly, temporary road easements would be needed for detouring highway traffic during bridge replacement. There are no known mineral deposits of commercial value within the project area, nor is there any known presence of hazardous material. Additionally, no displacements or resettlements are anticipated under Public Law 91-646. Any relocations of public facilities/utilities are expected to occur in place. The total project

real estate cost, including administration and contingencies, is estimated to be $162,800. The real estate details are presented in appendix D.

4.05. ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION.

The preferred alternative was analyzed using a combination of quantitative and qualitative methods to determine impacts to ecological and social resources. The generation of project specific data, the use of existing data, and professional judgments formed the basis for the conclusions summarized in this section.

a. Environmental Elements Not Affected by the Proposed Action.

The following elements would realize no or minimal direct, indirect, or cumulative impacts by the proposed project.

(1) Ecological Resources.

- Wetlands – No jurisdictional wetlands were identified in the proposed project area.
- Wildlife – Small mammals, including various birds, utilize areas within the project area. Temporary impacts to these species would occur during project construction. However, it is likely any wildlife that is displaced by construction could find suitable habitat in nearby areas.
- Air Quality – The Waitsburg area experiences periodic dust storms during times of low rainfall. The operation of trucks and other construction equipment would temporarily increase emissions for the duration of the project (4 to 6 months). These increases in emissions are expected to be minimal and would not result in a detectable level beyond what is normally generated in the Waitsburg area.

(2) Social Resources.

- Environmental Justice – Development of this project took into account possible effects on minorities and low-income populations. Observations of affected residences along the proposed project indicate there are comparable impacts to residences of low and high incomes.
- Utilities – Any utilities requiring relocation would be coordinated with the affected residences/businesses prior to the action. Any utility outages would be expected to be short term.

- Public Services/Traffic – Traffic on U.S. 12 would experience a slight travel delay during construction of the proposed project. There would be no change in fire, ambulance, law enforcement, and other emergency services to and from Waitsburg as a result of this project. The bridge currently carries average daily traffic of 4,100 vehicles per day; 13 percent are trucks. Waitsburg continues to grow, however, this project is not expected to contribute to an increase in traffic flow or to the growth of Waitsburg. The new bridge will, however, safely accommodate increased use as population increases. For the duration of construction, traffic will be rerouted onto the detour bridge. Although this will slow the movement of traffic, the effects will be temporary in nature and not considered significant.

- Noise – U.S. 12 through Waitsburg currently creates some noise disturbance. This would be temporarily increased by construction of the bridge, floodwalls, and levees. Construction noise would be temporary and intermittent. Wildlife in the area would avoid construction activities; therefore, no harm to wildlife would occur. The completed project is not expected to have a significant adverse noise impact to the residents or wildlife in the area. A traffic noise analysis is required by law for Federally funded projects that: (1) involve construction of a new highway; (2) significantly change the horizontal or vertical alignment; or (3) increase the number of through traffic lanes on an existing highway. The proposed project does not meet these criteria. Therefore, a formal noise analysis is not required. However, the detour and temporary bridge will be placed extremely close to one residence. This residence would experience increased noise levels for the duration of the bridge relocation.

- Cultural Resources – Waitsburg is a historic community with a rich prehistoric and historic past. The land at the confluence of the Coppei Creek and Touchet River was a part of cultural landscapes occupied over the past 11,000 years by native peoples. However, little is known of local prehistory and people's direct use of the Coppei-Touchet valley. The historic use by Indian families of the area is known largely through scattered reference and oral traditions. The project lies within one of the very first homesteads that were owned by one of the founding men of Waitsburg and his descendents.

  There are four historic sites: the Coppei Creek Bridge 12 / 666; a historic artifact scatter associated with the Bruce's homestead; a flood control ditch; and the remains of the Oregon, Washington

Railroad and Navigation Company railroad gate. An early modern artifact scatter is associated with the last site. These sites have been documented in a cultural resources report that is to be submitted to the Preservation Offices of Washington State and the Confederated Tribes of the Umatilla Indian Reservation. In addition, a pair of historic pillars, located at the end of the driveway of a historic home, will be protected in the rerouting of traffic during the replacement of Coppei Creek Bridge 12 / 666.

Project activities would have no adverse affect to the railroad site or the flood control ditch and would not disturb these two linear features. These two linear features are not considered eligible for the National Register, as they do not meet eligibility criteria under the National Historic Preservation Act. Both the Coppei Creek Bridge 12 / 666 and the historic artifact scatter were evaluated for their eligibility to the National Register. The historic artifact scatter was found to lack physical integrity and, therefore, ineligible for the National Register. Coppei Creek Bridge 12 / 666 has not been listed on the National Register for Historic Bridges. The Waitsburg Historical Society has expressed an interest in the town's oldest bridge, Coppei Creek Bridge 12 / 666, that was built in 1920. This small bridge has a substantial arch substructure and unique decorative elements (*e.g.,* side rails and lamp posts) currently hidden by guardrails and signs. The bridge, one of three at the entryways into town, is considered a part of Waitsburg's historic setting. Consequently, the historical society has requested that, if Coppei Creek Bridge 12 / 666 is replaced, key architectural features should be incorporated into the new bridge design to the extent possible.

b. Environmental Elements Affected by the Proposed Action.

The following sections summarize direct, indirect, and cumulative impacts to ecological and social resources. It also identifies mitigation measures that would be taken to offset any adverse effects of the project.

(1) Floodplains.

For the purposes of floodplain management in the proposed project area, base flood elevations were used for floodplains within the City of Waitsburg. These base flood elevations are also used when demonstrating compliance with all Federal, state, or local floodplain regulations. Floodplain maps with water surface elevation contours and the floodway are shown in the Hydrology Appendix of this report (see appendix B, Maps 1 through 8).

(a) Affected Environment.

The 1-percent chance exceedance flood for Coppei Creek has been previously altered by the construction of temporary levees and berms during emergency conditions. Other parts of the stream appear to have been straightened by the addition of armor to the banks, which precludes stream meandering. Logs and other debris have been removed from the creek in an effort to avoid constriction of the channel.

(b) Impacts of the Proposed Action.

1. Direct Effects.

- The floodplain to the north of Coppei Creek would be restricted to the area riverward of the new levee and concrete flood protection walls.
- The proposed project with levees, floodwalls, and a new bridge does not increase the water surface elevations in the floodway more than 0.31 meter (1 foot) over the existing condition. The proposed levees or structures do not encroach on the floodway.
- A total of 19 610.8 cubic meters (25,650 cubic yards) of material will be placed along or within the 1-percent chance exceedance floodplain for construction of the floodwalls and levees. An additional 917.5 cubic meters (1,200 cubic yards) will be placed within the 1-percent chance exceedance floodplain for construction of the new bridge.
- An analysis of flood flows show that the proposed project will induce flooding in one small area, approximately 0.41 hectare (1 acre) in size that has not flooded in the past.

2. Indirect Effects.

None anticipated.

3. Cumulative Effects.

None anticipated

4. Mitigation.

None

(2) Vegetation.

The vegetative cover along the proposed project area has been field determined. Biologists used qualitative and quantitative analysis in determining the existing condition of the riparian and streamside vegetation.

(a) Affected Environment.

The stream banks are dominated by alder, willow, cottonwood, and locust, among other tree species. Reed canary grass is prevalent in the area and tends to choke out other species in many reaches of the creek, creating monotypic stands. The vegetation along the creek alignment has been altered by past land use practices, particularly by the periodic dredging of sediments that occurred prior to species in the creek being listed under the ESA. The riparian area was also altered by the building of armored berms pushed up directly adjacent to the creek. The riparian area that exists now is of recent origin and is significantly narrower that an undisturbed one would be.

(b) Impacts of the Proposed Action.

1. Direct Effects.

Several trees directly within the levee alignment would need to be removed during construction. Due to mandates for maintenance, trees would not be allowed to reestablish on the levee. However, trees between the levee and the creek would be left standing. After construction is complete, the levee would be revegetated with a mix of grass species similar to that of the surrounding area.

2. Indirect Effects.

The removal of some riprap between the stream and the flood control structure may allow a more mature riparian zone to develop over time. Mandates for maintenance require that the earthen levee remain free of large woody vegetation for the life of the project. However, this will not present a change from current land used practices, as most of the levee would be built on farm fields.

3. Cumulative Effects.

None anticipated.

4. Mitigation.

Construction of the floodwall and new bridge would require the removal of several large trees and other smaller vegetation. The loss of mature trees would be mitigated by the planting of new trees as on-site mitigation.

(3) Threatened and Endangered Species.

Under Section 7 of the ESA, the USFWS and NMFS review Federal actions that could affect ESA-listed fish, wildlife, and vegetative species. The ESA species in the area were evaluated in the Biological Assessment (see appendix C).

(a) Affected Environment.

A list of ESA-listed species that could potentially be in the area was provided by the USFWS and NMFS. The listed species include:

Columbia Basin bull trout (*Salvelinus confluentus*)
Middle Columbia Basin Steelhead (*Oncorhynchus mykiss*)
Bald Eagle (*Haliaeetus leucocephalus)*
Ute Ladies'-tresses (*Spirantheses diluvialis*)

1. Columbia Basin Bull Trout.

Bull trout have not been found in Coppei Creek during recent (1998 and 1999) surveys by the WDFW. However, bull trout are found within the Touchet River drainage further upstream.

2. Middle Columbia Basin Steelhead.

Steelhead have been documented in Coppei Creek year round. After spending 1 to 2 years rearing in the area, juveniles begin their outmigration to the ocean during April and May when flows are high.

3. Bald Eagle.

The bald eagle is an uncommon winter resident within the project area. In the past, records of sightings have occurred in the region between November and April. Although bald eagle nesting has occurred in the Columbia basin, none has been documented in the Coppei Creek drainage.

4. Ute Ladies'-tresses.

No Ute ladies'-tresses were observed during the July 11, 2000, site evaluation. Some potential habitat exists, but much is dominated by reed canary grass.

(b) Impacts of the Proposed Action.

1. Direct Effects.

Middle Columbia Basin Steelhead are the most likely ESA-listed species to be impacted by the project because of their year-round presence. The Corps has initiated formal consultation with the NMFS. The other ESA-listed species are not likely to be adversely impacted. The Corps has completed informal consultation with the USFWS (see appendix A, USFWS letter dated August 8, 2001). The construction work will be performed within designated work windows and comply with any additional requirements set forth by the USFWS and NMFS.

2. Indirect Effects.

None anticipated.

3. Cumulative Effects.

Long-term cumulative effects would most likely be positive, as a more natural riparian area would be allowed to develop.

(c) Mitigation.

During all construction work, best management practices as outline in the Biological Assessment (see appendix C) will be followed, including in-water work windows.

(4) Water Quality.

Reviews of existing water quality data and previous environmental documentation were used to assess water quality conditions of Coppei Creek in the project area. Water quality standards set forth by regulating agencies were taken into account when assessing the effects of the proposed project on water quality. There will be short-term increases in turbidity during parts of the construction. No long-term effects are anticipated. These will be addressed in the 401 certification issued by the Department of Ecology.

(a) Affected Environment.

Coppei Creek originates in the Blue Mountain and is a tributary of the Touchet River, terminating with a delta or alluvial fan upon which the City of Waitsburg is located. Flooding on alluvial fans is characterized by high velocity flows, active processes of erosion, sediment transport and deposition, and unpredictable flow paths. Coppei Creek drains 96 square kilometers (37 square miles) with the total length of the drainage above Waitsburg being approximately 25.7 kilometers (16 miles). Elevations within the Coppei Creek basin range from 368.2 to 1 353.9 meters (1,208 feet to 4,442 feet).

Sections of the stream were cleared and/or straightened many years ago. There are also remnants of old dikes along the right bank throughout each reach. Some channel down cutting has taken place. The creek is very sinuous in the reach between the Coppei Creek Bridge 12 / 666 and the Seventh Street Bridge.

The DOE does not list specific water quality conditions in the Coppei Creek. However, WSDOT and DOE have an Implementing Agreement regarding compliance with the DOE surface water quality standards, dated 13 February 1998. The requirements of this agreement will be followed throughout the construction project.

(b) Impacts of the Proposed action.

1. Direct Effects.

Construction of the new bridge includes placement of about 535 cubic meters (700 cubic yards) of material below the ordinary high-water mark. During removal of the old bridge abutments, the streamflow would need to be rerouted through the construction area in order to separate excavation and placement of material from flowing water. This action is expected to have temporary, short-term impacts to water quality.

2. Indirect Effects.

None anticipated.

3. Cumulative Effects.

None anticipated.

(c) Mitigation.

Best management practices will be followed while working in or near the water. These include:

- Compliance with all water quality protection related conditions contained in the WDFW Hydraulic Project Approval, including time limitations.

- The natural flow of any affected water body shall be diverted around the construction site unless written approval to work in the flowing water is obtained from WDFW. The stream diversion system shall be designed and operated so as to not cause erosion or scour in the stream channel or banks of the water body.

- All materials shall be clean and durable, free from dirt, sand, clay, and rock fines.

- Heavy equipment shall be operated as far from the waters edge as possible. Impacts to banks and shoreline vegetation shall be stabilized and revegetated.

- Work in or near the waterway shall be done so as to minimize turbidity, erosion, other water quality impacts, and streambed deformation. All construction debris and excess sediment shall be properly managed and disposed of so as to prevent it from entering the waterway or causing water quality degradation to state waters.

- All work in or near the water and water discharged from the site shall meet the State's Water Quality Standards, Washington Administrative Code (WAC) 173-201A. A mixing zone for turbidity is authorized within the WAC 173.201A-030 during and immediately after necessary in-water or shoreline construction activities that result in the disturbance of in-place sediments. Use of a turbidity mixing zone is intended for brief periods of time (such as a few hours or days) and is not an authorization to exceed the turbidity standard for the entire duration of construction. Use of the mixing zone is subject to constraints of WAC 173-201A-100(4) and (6) requiring an applicant to have supporting information that indicates the use of the mixing zone shall not result in the loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or adversely affect public health. The mixing zone is authorized only after the activity has received all other necessary local and state permits and approvals and after the implementation of appropriate best

management practices to avoid or minimize disturbance of in-place sediments and exceedances of the turbidity criteria. Within the mixing zone, the turbidity standard is waived, and all other applicable water quality standards remain in effect. The mixing zone is defined as follows: For water up to 0.28 cubic meters per second (10 cubic feet per second) flow at the time of construction, the point of compliance shall be 30.5 meters (100 feet) downstream of project activities.

(5) Land Use/Ownership.

Walla Walla County's Comprehensive Plan was used to determine current and proposed land use designations. Additionally, communications with landowners in the project area have been ongoing to determine local landowners views.

(a) Affected Environment.

Land use along Coppei Creek in the vicinity of the proposed project primarily consists of residential yards and acreages used as pasture land or farmland. The entire length of the project encompasses approximately 1 443.1 meters (4,734.6 feet).

(b) Impacts of the Proposed Action.

1. Direct Effects.

- The new levee and floodwall are expected to induce flooding on one confined area just southwest of the bridge. A small barn that could be damaged as a result of flooding occupies this area.

- The easements acquired for levees that are built within the boundaries of privately owned acreages may include land use restrictions.

- The new highway right-of-way acquired for the bridge may mean that portions of some residential yards may be appropriated for road construction.

2. Indirect Effects.

In the event a flood occurrence greater than 1-percent chance exceedance flood takes place, it could overtop the levee and pond on the

landward (north) side of the levee. Ponding in the downtown area could cause damage to residential buildings and businesses that would be protected from Coppei Creek flooding at the 1-percent chance exceedance flood.

3. Cumulative Effects.

None anticipated.

(c) Mitigation.

Easement purchases are the only reasonable mitigation measures available for the above-mentioned effects. Easements will be used to the greatest extent possible.

(6) Aesthetics.

Visual quality values were evaluated based on input from local landowners and residents, the non-Federal Sponsor, and field observations.

(a) Affected Environment.

Nearly 1.6 kilometers (1 mile) of levee or floodwall would be placed adjacent to the right bank (looking downstream) of Coppei Creek. These structures would be visible to local residents, people attending events at the fairgrounds, and the traveling public as they cross the Coppei Creek Bridge 12 / 666, which is part of the U.S. 12 highway.

(b) Impacts of the Proposed Action.

1. Direct Effects.

The levees would rise above the existing grade at a height of not more than 32.8 meters (10 feet), and the floodwalls would rise above the grade not more than 1.8 meters (6 feet). In many instances, these structures would be in plain view of residents, recreationalists, and the traveling public.

The aesthetic value of the old bridge would be lost after its removal, except for written and photographic documentation. The unique architecture of the bridge can only be seen from the riverside, not from the road (except street lights.)

2. Indirect Effects.

None anticipated.

3. Cumulative Effects.

None anticipated.

(c) Mitigation.

Although the levees would vary in height along the alignment, the swell would be a gradual hill between 0 and 3.1 meters (0 and 10 feet) in height and seeded to match the existing vegetative landscape.

Where it is feasible and desired by the property owners, a hedge could be planted alongside the new floodwall(s) for aesthetic purposes. Otherwise, the side of the floodwall facing away from the creek would be re-vegetated to its previous condition with trees and grasses. The side of the floodwall facing the creek would be re-vegetated with native grasses and forbes to encourage bank stability.

4.06. ENVIRONMENTAL REVIEW REQUIREMENTS.

This section addresses the primary environmental requirements that are applicable to this project, including relevant Federal Statutes, Executive Orders, and State Permits.

a. Federal Laws, Policies, and Regulations.

(1) Clean Water Act.

The Clean Water Act sets national goals and policies to eliminate discharge of water pollutants into navigable waters, regulate discharge of toxic pollutants, and prohibit discharge of pollutants from point sources without permits. The act also authorizes the Environmental Protection Agency to establish water quality criteria that are used by states to establish specific water quality standards.

The construction work associated with replacement of the existing Coppei Creek Bridge 12 / 666 meets the requirements of Nationwide Permit No. 14 "Linear Transportation Crossings." Linear Transportation Crossings are defined, in part: "Activities required for the construction, expansion, modification, or improvement of linear transportation crossings (*e.g.*, highways, railways, trails, and airport runways and taxiways) in waters of the United States, including wetlands . . . . ."

However, the DOE has partially denied without prejudice Nationwide Permit No. 14 because the proposed work includes above-grade fill within the 1-percent chance exceedance floodplain. Therefore, a Section 401 Water Quality certification or waiver would be requested from DOE, and any special water quality conditions incorporated into the final project (see appendix A).

(2) Clean Air Act.

The Clean Air Act establishes a comprehensive program for improving and maintaining air quality throughout the United States. The goals of the Clean Air Act are achieved through permitting of stationary sources, restricting the emission of toxic substances from stationary and mobile sources, and establishing National Ambient Air Quality Standards.

Construction activities would result in only minor, short-term exhaust emission from construction equipment. Fugitive dust from this project would also be minimal. Once the project is complete, air quality would return to pre-project levels. Therefore, this project would be in compliance with the Clean Air Act.

(3) Endangered Species Act.

Section 7 of the ESA prohibits Federal Agency actions from jeopardizing listed species or adversely modifying their designated critical habitat. Bull trout, steelhead, bald eagle, and Ute Ladies'-tresses are listed as threatened species and identified as potentially affected by the proposed action. The USFWS and NMFS have been consulted regarding listed species in the study area. A Biological Assessment (see appendix C) has been prepared and forwarded to both agencies to address species and habitat impacts, where applicable. The Corps, Walla Walla District, has determined that the project would have no affect on bald eagles and that the project may affect, but is not likely to adversely affect bull trout or Ute ladies' tresses. The USFWS has concurred with these determinations. The Corps has determined that the project may affect, and is likely to adversely affect steelhead or their habitat. These affects should be short term. Negative affects would be reduced as vegetation re-establishes, providing increased shade and cover to the stream. The Corps will work with NMFS to avoid, minimize, and/or mitigate for possible impacts to steelhead (see appendix A).

Based on this input, the project would be in compliance with the ESA. However, construction is not scheduled to occur until 2003. A new list will be obtained within 6 months of the time of construction, and, if additional species are present, the Corps will re-consult with the USFWS and NMFS.

(4) Fish and Wildlife Coordination Act, As Amended.

Whenever the waters of any stream are proposed or authorized to be modified for any purpose, by any agency of the United States, then that agency shall consult with the USFWS with a view to the conservation of wildlife resources by preventing loss of and damage to such resources as well as providing for development and improvement in connection with such water-resources development.

In a letter dated May 2, 2001 (see appendix A), the USFWS indicated that due to existing staff workload in their office, they are unable to participate in the preparation of a Coordination Act Report. However, the USFWS did review the Biological Assessment (appendix C) that was also sent to WDFW for review.

(5) National Historic Preservation Act.

Section 106 of the National Historic Preservation Act requires that Federal agencies evaluate the effects of Federal undertakings on historical, archaeological, and cultural resources and consult with the State Historic Preservation Office, consulting entities, and other interested parties regarding cultural resource impacts.

The effects of the proposed project on historic and prehistoric resources were evaluated using record searches, surveys, and oral communications with local residents. The results of the evaluation were documented with a recommended determination. That documentation was forwarded to the Washington State Historic Preservation Office and interested Tribal Historic Preservation Offices for review and comment (see appendix A).

(6) Migratory Bird Treaty Act.

The Migratory Bird Treaty Act provides protection to migratory birds and prohibits the destruction of their active nests or nestlings. The flood control work would be performed in such a manner that migratory birds or their habitat would not be harmed or harassed. The proposed work would be performed outside of the major nesting season for most birds. Bird species that nest later in the summer may be impacted by noise and activity associated with construction. The proposed action would result in the loss of several mature trees that may serve as nesting sites for bird species. However, planting new trees to replace those that were lost would mitigate the loss. Many other trees in the immediate area would be undisturbed and can serve as new nesting places while the newly planted trees mature. Some brush and small trees may be damaged or removed during construction.

(7) Wild and Scenic Rivers Act.

The Wild and Scenic Rivers Act establishes the policy that certain rivers, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values shall be preserved in free-flowing condition and their immediate environments protected. The purpose of the Wild and Scenic Rivers Act is to protect the environmental values of free-flowing streams from degradation by impacting activities including water resources-related projects.

Coppei Creek is not included on the inventory of wild and scenic rivers. Therefore, this act does not apply to the proposed project.

(8) Rivers and Harbors Act.

Section 10 of the Rivers and Harbors Act regulates structures or work in or affecting navigable waters of the United States, including discharges of fill materials.

Coppei Creek is not a navigable stream, and, therefore, this project will not violate the objectives of the Rivers and Harbors Act.

(9) Department of Transportation Act of 1966, Section 4(f).

A Section 4(f) evaluation is not required for the proposed project under the guidance of WSDOT, stating that in order to qualify for historic bridge status, the structure must be at least 15.2 meters (50 feet) long. The current structure was evaluated during an inventory of bridges and determined that, although it may have local historic significance, it is not listed as an historic structure.

(10) Stormwater Management Act.

The Stormwater Management Act is intended to regulate the quality of waste entering streams as a result of stormwater runoff. This applies to construction sites as well as completed projects.

The completed proposed project may alter the stormwater runoff patterns of the project area. During construction, best management practices would be in place to prevent construction impacts to stormwater. If stormwater run-off were determined to be an issue during development of final plans and specifications, an interior drainage system would be developed and implemented.

(11) Watershed Protection and Flood Prevention Act.

The purpose of the Watershed Protection and Flood Prevention Act is to protect watersheds from erosion, floodwater, and sediment damages. The act provides assistance programs to local organizations for protection of watersheds, including flood control.

The action proposed by this project would not have any adverse effects on the watershed and would provide a measure of flood control.

(12) Farmland Protection Policy Act.

The purpose of the Farmland Protection Policy Act is to minimize the irreversible conversion of farmland to nonagricultural uses.

Minimal farmland would be converted to a nonagricultural use as a result of this project.

b. Executive Orders.

Executive Order 11988, Floodplain Management, outlines the responsibilities of Federal agencies in the role of floodplain management. Each agency shall evaluate the potential effects of actions on floodplains and should avoid undertaking actions that directly or indirectly induce growth in the floodplains or adversely affect natural floodplain values.

The proposed project does not induce development in the existing floodplain at Waitsburg, Washington.

c. State and Local Laws, Policies, and Regulations.

(1) Washington State Shoreline Management Act.

The purpose of the Washington State Shoreline Management Act is to manage and protect the shorelines of the state by regulating development in the shoreline area. A major goal of the act is "to prevent the inherent harm in an uncoordinated and piecemeal development of the state's shorelines." Its jurisdiction includes the Pacific Ocean shoreline and the shorelines of Puget Sound, the Strait of Juan de Fuca, rivers, and streams and lakes above a certain size. It also regulates wetlands associated with these shorelines. Under this act, local governments have the primary responsibility for the regulatory requirements of the act.

A Washington State Shoreline Management Act permit would be obtained by the non-Federal Sponsor prior to construction.

(2) Hydraulic Project Approval.

The non-Federal Sponsor will be responsible for obtaining a Hydraulic Project Approval from WDFW. This may be requested as part of the comprehensive Joint Aquatic Resources Permit Application from Washington State.

(3) Walla Walla County Critical and Sensitive Areas Ordinance.

The purpose of this ordinance is to protect, improve, and maintain critical areas within Walla Walla County. Critical areas include wetlands, areas with a

recharging effect on aquifers for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas. This ordinance establishes a minimum of 7.6 meters (25 feet) as a protection zone against adverse impacts.

The bridge and concrete floodwall of the proposed project would both be within 7.6 meters (25 feet) of Coppei Creek. However, they meet the requirements under section 18.08.070, Exemptions to Standards. There are no practicable alternatives that would not have other significant adverse environmental consequences. The proposed development would not jeopardize the continued existence of species listed as endangered, threatened, or proposed, and the bridge constitutes a public transportation project necessary to the life and safety of citizens.

SECTION 5.0 - ECONOMIC EVALUATION

5.01. SCOPE OF ECONOMIC EVALUATION.

This section presents procedures and methodologies used to evaluate the economic effects of the proposed flood damage reduction project on Coppei Creek for the City of Waitsburg in Walla Walla County. Economic studies undertaken as part of this report have been streamlined due to the scale of the project. The evaluation includes an assessment of damages for the without-project conditions compared to damages for the with-project conditions at the desired level of protection (*i.e.,* 1-percent chance exceedance flood). A sensitivity analysis (based on range of damages prevented and cost to construct) was conducted to determine a range of effects from the worst to best-case conditions as well as the expected results.

5.02. ECONOMIC ASSESSMENT.

The City of Waitsburg area identified as in the floodplain outline consists of approximately 82 hectares (203 acres) of mostly developed urban land. This study consists of assessing the value of 109 residential structures, 32 commercial structures, 19 public buildings, 6 public utilities structures, and 3 bridges. Other non-structural damages also evaluated were streets/pavement, clean up costs, emergency relocation expenses, and parks and landscaping potential damage costs. Table 5-1 places in the proper perspective the total market value, expected damages, and expected average annual damages that would occur in the 1-percent chance exceedance floodplain. Total market value of the floodplain is $33 million (see figure 5-1). The proportion of the total value that would be damaged by the 1-percent chance exceedance flood equates to $7.8 million (see figure 5-2). Given the probabilities of the 1-percent chance exceedance flood occurring in any 1 year, the expected average annual damages would equate to approximately $286,000 (see figure 5-3).

Table 5-1. Waitsburg, Washington, Expected 1-Percent Chance Exceedance Flood Event Evaluation.

Item	Units	Market Valuation 1999 (in dollars)	Percent of Total Inventory (Rounded)	Actual Damage Percent	Actual Dollar Damages [1/]	Expected Average Annual Damages	Percent of Expected Annual Damages (per category)
Residential Structures/Contents	109	$10,236,200	30.99	11.9	$1,220,155	$44,917	15.7
Commercial Structure and Inventory	32	2,943,625	8.91	34.4	1,012,901	37,193	13.0
Public Buildings and Contents	19	11,466,570	34.71	20.4	2,334,594	85,830	30.0
Public Utilities	6 items	2,600,000	7.87	50.0	1,300,000	47,779	16.7
Bridge Replacement	3	4,050,000	12.26	25.0	1,000,000	36,620	12.8
Streets	16,600 lin ft	1,660,000	5.03	50.0	830,000	30,441	10.64
Clean Up Costs		20,258	0.06	100.0	20,258	744	0.26
Emergency Relocation Expenses ($650/house)	84 families	54,600	0.17	100.0	54,600	2,003	0.70
Parks Landscaping	4 acres	3,200	0.01	100.0	3,200	114	0.04
Totals		**$33,034,453**	**100%**		**$7,800,000**	**$286,100**	**100%**

[1/] Math may not be exact due to rounding.

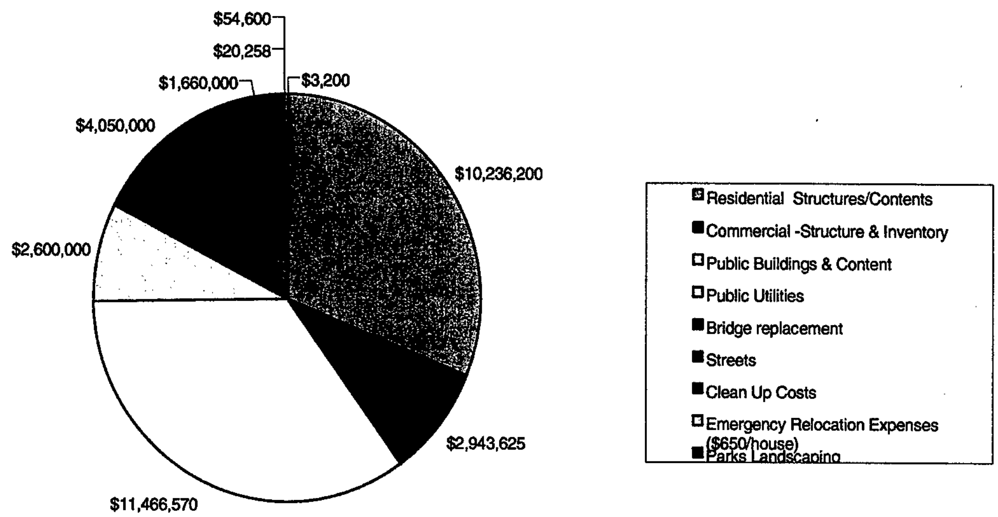

Figure 5-1. Inventory Market Value Dollar.

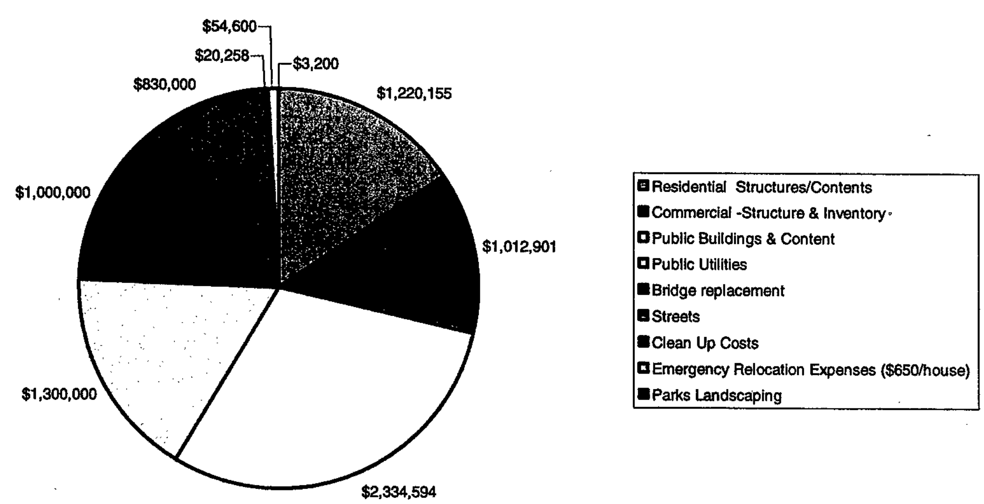

Figure 5-2. One-Percent Chance Flood Estimated Dollar Damages.

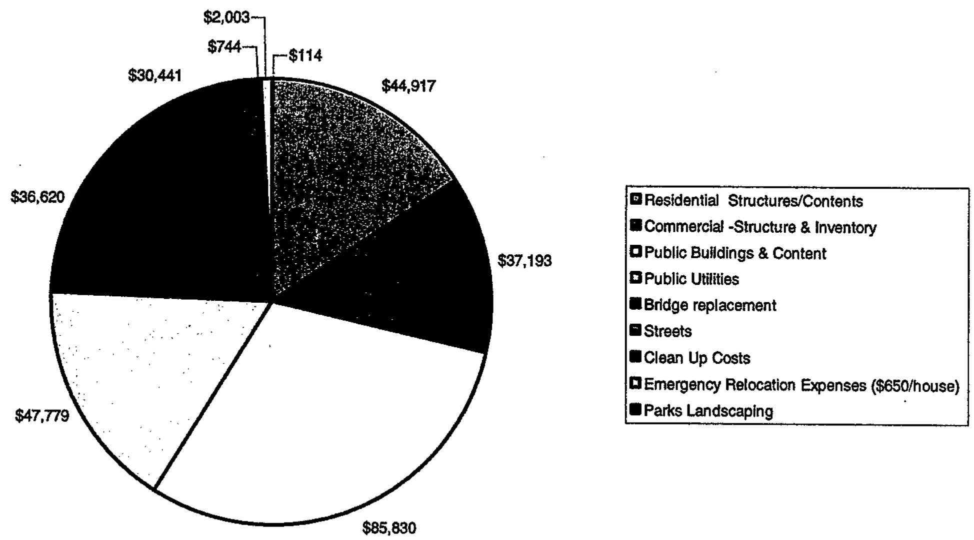

Figure 5-3. Expected Average Annual Damages.

5.03. EXISTING FLOOD PROTECTION.

The study area currently has no formal flood protection. Sections of earthen dikes exist in various locations along the Coppei Creek right bank. These dikes were constructed by the City of Waitsburg and do not meet Federal standards. They were only partially effective during the spring 1996 flood event and were breached in several locations. These are not considered permanent nor adequate to protect against a 1-percent chance exceedance flood.

5.04. AVERAGE ANNUAL DAMAGES, WITHOUT-PROJECT CONDITIONS.

a. Level of Detail.

The economic analysis was based on fieldwork conducted and the data gathered from the assessor's office for the City of Waitsburg that included an inventory and values of structures in Waitsburg. A floodplain outline was used to identify those structures that would be affected. Damage estimates were prepared for the 2-percent, 1-percent, and .5-percent chance exceedance flood event. The 1-percent chance exceedance flood would inundate the entire study area, 82 hectares (203 acres). During this event, residential structures would have water depths averaging about 0.12 meter (0.4 foot) above first floor elevations; public buildings averaged 0.82 meter (2.7 feet); while businesses averaged 1.3 meters (4.1 feet) above first floor elevations. Total damages for the 1-percent chance exceedance flood without-project conditions were $7,800,000. Table 5-2, column 3, shows the estimated damages at various flood frequency levels.

b. Methodology.

Average annual damages under existing conditions were evaluated and estimated at $286,100 for the 1-percent chance exceedance flood. The average annual damages prevented at the 1-percent chance exceedance flood is the target level of protection for the with-project conditions.

Table 5-2. Flood Frequency Damage Analysis.

Location: Waitsburg, WA Reach: Coppei Creek Price L: 1999 Condition: Without Project Item: All Damage Categories						
Discharge (cfs) [1/]	Frequency	Dollars Damage	Average Damage of Interval	Frequency of Interval	Annual Damage	Accum. Damage
200	0.8000	$0				$0
			$0	0.3400	$0	
330	0.4600	0				0
			0	0.1200	0	
400	0.3400	0				0
			0	0.1770	0	
600	0.1630	0				0
			0	0.0430	0	
700	0.1200	0				0
			0	0.0300	0	
800	0.0900	0				0
			250,000	0.0210	5,250	
900	0.0690	500,000				5,250
			3,000,000	0.0290	87,000	
1150	0.0400	5,500,000				92,250
			5,650,000	0.0050	28,250	
1200	0.0350	5,800,000				120,500
			6,150,000	0.0140	86,100	
1500	0.0210	6,500,000				206,600
			7,050,000	0.0080	59,400	
1800	0.0130	7,600,000				263,000
			7,700,000	0.0030	23,100	
2000	0.0100	7,800,000				286,100
			8,250,000	0.0045	37,125	
2500	0.0055	8,700,000				323,225

[1/] cubic feet per second.

5.05. INUNDATION REDUCTION BENEFITS.

Under current conditions, floodwater depths at residences in the study area for the 1-percent chance exceedance flood were estimated at just under 0.15 meter (0.5 foot). The commercial and public buildings would realize larger floodwater depths, approximately 1 to 1.2 meters (3 to 4 feet), due to expected pooling in the downtown area. This flooding would be greatly reduced and, in some degree,

eliminated by the project. An average annual reduction in damages was estimated with the proposed construction of a combination of levees, floodwalls, and bridge replacement providing a 1-percent chance exceedance flood level of protection. Average annual inundation reduction benefits associated with a levee providing 1-percent chance exceedance flood protection totaled $286,100.

5.06. RISK AND UNCERTAINTY.

In accordance with guidance in Engineer Circular 1105-2-211, dated February 15, 1996, the Corps, Walla Walla District, staff used judgment to perform the appropriate level of detail analyses to produce a quality product. A formal, full risk and uncertainty evaluation was not performed for this proposed project. A waiver from the non-Federal Sponsor supported this level of evaluation due to time and cost constraints (see appendix A). A sensitivity analysis was conducted based on the level of variation in input data such as level of flooding, values of inventory, and variations in expected costs to build the levee that experts believed to be acceptable. Further risk-based analysis associated with economic variables was not considered to be value-added as the scope of the project was driven by limited time and economic resources. Damages prevented variance was set at + or – 30 percent and variances in cost at + or – 10 percent. A comparison of project costs and benefits yields an expected benefit-to-cost ratio for 1-percent chance exceedance flood protection of 1.49 to 1.0. Best- and worst-case scenarios were evaluated, yielding estimated ratios of .95 to 1.0 and 2.15 to 1.0, respectively.

5.07. AVERAGE ANNUAL CHARGES.

A detailed cost estimate was prepared for the proposed construction of a levee providing a 2-percent, 1-percent, and .5-percent chance exceedance flood level protection and can be found below in table 5-3. Total first costs for a levee providing 1-percent chance exceedance flood protection have been estimated to be $2,800,000.[1] Interest and amortization charges were based on a 6.375-percent discount rate and a 50-year project life, with a construction period estimated at less than 1 year. Since the estimated construction period is estimated at less than 1 year, no interest during construction was applied to the first costs of construction. Estimated annual O&M costs are $5,000.

[1] Rounded from the estimated cost of $2,673,000. Rounding the cost of the preferred plan does not affect selection of the most cost-effective alternative.

Table 5-3. Coppei Creek Section 205, Waitsburg, Washington, Cost Structure.

Level of Flood Protection	Total Costs	Annual Costs (6.375 %) (50 Years)	Annual O&M Costs	Total Annual Costs
2 % Chance	$1,984,400	$132,509	$5,000	$137,509
1 % Chance	2,800,000	187,009	5,000	192,009
.5 % Chance	4,078,000	272,365	5,000	277,365

5.08. PROJECT MAXIMIZATION.

The project is maximized at the 1-percent chance exceedance flood level of protection at a net annual benefit of $94,091. The NED plan and recommended plan is alternative 1 at the 1-percent chance exceedance level of protection. The net annual benefits for the 2-percent chance exceedance level of design is $69,091 and $45,860 for the .5-percent chance exceedance flood level of design.

"Maximizing net benefits" is an economic evaluation concept to determine the size of project or investment to the point where the last increment of cost is less than the incremental benefit. See table 5-4 below.

Table 5-4. Maximization Analysis.

Location: Waitsburg, WA Reach: Coppei Creek Price Level: 1999 Condition: Without Project Item: All Damage Categories							
Maximization	Annual Benefits	Net Annual Benefits	Annual Costs	Incremental Annual Cost	Incremental Annual Benefit	Incremental Net Annual Benefit	Benefit/ Cost Ratio
2% Chance Flood Protection	$206,600	$69,091	$137,509	$137,509	$206,600	$69,091	1.50
1% Chance Flood Protection	286,100	94,091	192,009	$54,500	79,500	25,000	1.49
.5 % Chance Flood Protection	323,225	45,860	277,365	85,356	37,125	-48,231	1.17

Note: Project benefits are maximized at the 1-percent chance exceedance flood level of protection resulting in net annual benefit of $94,091. Flood protection at the .5 percent chance exceedance flood level cannot be justified in that incremental annual cost ($85,356) exceeds incremental annual benefit ($37,125) by over $48,000. Even though the benefit/cost ratio for the 2-percent chance exceedance flood level of protection (1.5) is slightly greater than the benefit/cost ratio for the 1-percent chance exceedance flood level of protection, the project net benefits are maximized at the 1-percent chance exceedance flood level of protection ($94,091 versus $69,091).

For this study, the 1-percent chance exceedance flood level of protection maximized net benefits and was the preferred plan. It was evaluated as follows:

Net Annual Benefit = Expected annual cost of damages prevented minus Expected annual costs for levee

or

Expected annual cost of damages (without flood protection)	$286,100
Expected annual cost for levee (includes O&M costs of $5,000)	- 192,009
Net Annual Benefit	$94,091

The 1-percent chance exceedance flood level of protection is recommended for this project since the net annual benefit was estimated to be maximized at this point.

SECTION 6.0 - IMPLEMENTATION PLAN

6.01. PROJECT COST ESTIMATE.

A cost estimate summary is shown in table 6-1. The project's detailed estimate can be found in appendix E. Construction costs reflect October 1999 price levels. The quantities shown are for in-place conditions. A swell factor of 1.25 and a compaction factor of .9 were used for calculating embankment material quantities. A cost contingency of 20 percent was used in the cost estimate for all items. The fully-funded cost estimate is based on a construction midpoint of fourth quarter 2004. Of the $1,483,000 fully-funded project cost, 65 percent would be the Federal share (currently estimated at $964,000 fully funded), and 35 percent would be the non-Federal share ($519,100 fully funded). The non-Federal Sponsor's share is derived as follows: The non-Federal Sponsor is required to fund the cost of the lands, easements, rights-of-way, relocations, and disposal (LERRD) areas (estimated to be $141,200); pay 5 percent of the total project cost ($74,200) in cash; and provide sufficient additional cash to bring the non-Federal Sponsor's share to 35 percent of the total project cost ($303,600).

Table 6-1. Cost Estimate Summary.

Feature	Cost ($k)	Contingency ($k)	Contingency (%)	Escalation ($k)	Total ($k)
Construction	682	136	20	92	910
Lands and Damages	136	27	20	16	179
Relocations[1/]	0	0	0	0	0
Planning, Engineering, and Design	203	39	20	20	262
Construction Management	98	20	20	14	132
Grand Total	1,119	222		142	1,483

[1/] The bridge and associated road approach work, valued at $1,190,000, will be performed by WSDOT at no cost to this project. (Construction funding is currently available, but availability may change.) However, the value of the bridge replacement is included in the section 5.0 economic analyses.

6.02. DESIGN AND CONSTRUCTION SCHEDULE.

The schedule for the design and construction of the proposed project (levees, floodwalls, and appurtenances), beginning with distribution of this report for public review, is listed in table 6-2. This schedule is based on Federal and non-Federal Sponsor funds being available when needed and assumes that the non-Federal Sponsor will require a full 8 months to acquire the real estate easements necessary for project construction. This results in construction in mid-summer and fall during

optimum construction weather and within work windows specified by fish and wildlife agencies.

The Coppei Creek Bridge 12 / 666 construction will be performed by the WSDOT under a separate contract. Timing of the bridge construction may not coincide with the levee and floodwall construction, but will likewise occur within the designated work windows. The WSDOT will need 12 months to acquire needed right-of-way to construct the bridge.

Table 6-2. Schedule.

Activity	End Date
Independent technical review begins.	December 2001
Detailed Project Report distributed for non-Federal Sponsor review.	January 2002
The Environmental Assessment distributed for public and agency review.	April 2002
Final public review comments received.	
Meeting of Feasibility Study Team, Technical Review Team, and non-Federal Sponsor to discuss and resolve comments.	May 2002
The Detailed Project Report and Environmental Assessment submitted for conditional approval to the Corps, Northwestern Division.	August 2002
Walla Walla District receives authority to initiate plans and specifications.	August 2002
Walla Walla District substantially completes plans and specifications and requests approval both for construction and to sign the Project Cooperation Agreement (PCA).	January 2003
Walla Walla District receives construction approval and authority to sign PCA.	February 2003
The PCA signed by WCFCD and the Corps, Walla Walla District, and WCFCD begins acquisition of necessary real estate interests.	March 2003
WCFCD certifies land acquisition completed and available for project construction.	January 2004
Corps issues invitation for bids for construction.	March 2004
Bids opened.	April 2004
Construction contract awarded.	April 2004
Notice to proceed issued to contractors.	May 2004
Construction physically completed.	October 2004
Project turned over to non-Federal Sponsor.	December 2004
WCFCD completes Floodplain Management Plan	December 2005
WCFCD implements Floodplain Management Plan.	December 2005

6.03. NON-FEDERAL SPONSOR'S FINANCIAL PLAN.

The WCFCD has strongly supported this Feasibility Study and intends to support construction of the project under consideration. By letter dated April 2, 2001, (see appendix A), WCFCD indicated understanding of the financial and legal responsibilities associated with a Section 205 Flood Control Project.

Support for the project from the City of Waitsburg, the WCFCD, and the WSDOT continues to be strong. By letter dated July 25, 2002, the project non-Federal funding is expected to come from a bond to be issued by the City of Waitsburg (see appendix A).

Real estate acquisition will be performed by the WCFCD. Some of the required lands may be donated to the project. Funds for any real estate acquisition costs and additional cash required will be obtained from non-Federal grants and or property taxes. The financial statement from the WCFCD is included in appendix A.

Relocation of the U.S. 12 bridge over Coppei Creek and associated road approaches will be performed by the WSDOT. This will be funded separately from the flood control project using a combination of State and FHWA funds (see appendix A).

6.04. ABILITY TO PAY.

Section 103(m) of Public Law 99-662 directed the non-Federal share of flood control and agricultural water supply projects to be subject to reduction under an "ability to pay" determination. Prescribed rules for evaluation on flood control projects require a two-step calculation process. In step one, a benefits-based floor is calculated and compared to the normal minimum cost share of 35 percent. The second step determines the eligibility of the project area for the full or partial reduction indicated in step one. The formula uses per capita personal income indices for the state and the county where the project is physically located to determine the area's income relative to all counties in the Nation.

Washington State per capita income is 4.6 percent higher than the average for the United States, and Walla Walla County ranks 20th out of 39 Washington counties in per capita income. Therefore, it is doubtful that this formula would result in any cost reduction by a non-Federal Sponsor in Walla Walla County, Washington.

6.05. RESPONSIBILITIES.

a. Local Floodplain Management Plan.

In the 1996 Water Resources Development Act (Public Law 104-303), the U.S. Congress added a new local cooperation requirement for non-Federal Sponsors of flood control projects. Within 1 year of signing the PCA for a flood control project, the

non-Federal Sponsor is now required to prepare a Floodplain Management Plan for the project area. The non-Federal Sponsor must implement the plan within 1 year following the completion of project construction.

On February 8, 2000, Walla Walla County prepared a *Comprehensive Flood Hazard Management Plan* (CFHMP) that was subsequently officially adopted by the County and approved by the State of Washington. The CFHMP's long-term goals are to reduce flood hazards and long-term flood control costs. Both the City of Waitsburg and Walla Walla County are participants in the Flood Insurance Program and have adopted floodplain ordinances. The current CFHMP appears to satisfy the requirement for the Floodplain Management Plan.

b. Operation and Maintenance of the Proposed Project.

The non-Federal Sponsor would be responsible for O&M following completion of the proposed project in accordance with an O&M manual that would be prepared by the Corps, Walla Walla District. In general, O&M standards include the following:

- Maintain 1 232 meters (4,042 feet) of levee, 262.4 meters (861 feet) of floodwall and make all necessary repairs, replacements, and rehabilitation.
- Maintain grass cover on all slopes requiring a grass cover, including mowing the levee at least twice annually.
- Correct any damage to embankment resulting from pedestrians, rodents, livestock, and/or vehicles.
- Remove shrubs and blackberries before they grow so thick on the levee slopes that they would obscure the condition of the levee and interfere with levee inspection.
- Maintain gates, culverts, and other levee facilities in a good state of repair and in good operating condition.
- Maintain the function of the runoff ponding area and prevent any encroachment that would limit its capacity or capability.

An annual inspection of the project would be conducted by both the Corps and the non-Federal Sponsor. Any deficiency discovered would be the non-Federal Sponsor's responsibility to correct. Annual O&M costs for the levee, floodwalls, and appurtenances are estimated to be $5,000. The WSDOT will only be responsible for operation and maintenance of the Coppei Creek Bridge 12 / 666.

c. Permits.

The non-Federal Sponsor, WCFCD, would be responsible for all required state and local permits. These include, but are not limited to, a Joint Aquatic Resources Permit Application/Hydraulic Project Approval, Shoreline Management Permit, *etc*. The WSDOT would be responsible for acquiring the permits for the bridge construction, except the 404 permit.

6.06. DRAFT PROJECT COOPERATION AGREEMENT.

On May 14, 2001, the WCFCD was provided a copy of the Corps' standard "Section 205 Form Local Cooperation Agreement" for their consideration and review. The WCFCD indicated in their Letter of Intent (see appendix A) that they understand the cost-sharing requirements for the proposed project as well as the other responsibilities of a non-Federal Sponsor and will be willing to sign the PCA at the proper time in the future.

In addition to its cash contribution, the WCFCD will be required to fulfill all the requirements in the draft PCA. The major items include the following:

- Provide all lands, easements, rights-of-way, and ensure performance of all relocations necessary for the construction, operation, and maintenance of the project.

- Hold and save the Federal Government free from damages due to the construction, operation, maintenance, repair, replacement, and rehabilitation of the project, except for damages due to the fault or negligence of the Government or its contractors.

- Operate, maintain, repair, replace, and rehabilitate the project after construction.

- Participate in and comply with applicable Federal floodplain management and flood insurance programs.

- Implement a Coppei Creek Floodplain Management Plan for Walla Walla County within 1 year following completion of project construction.

- Inform affected interests of the extent of protection provided by the project not less than once each year.

- Publicize floodplain information in the area concerned. Provide this information to zoning and other regulatory agencies for their use in preventing unwise future developments in the floodplain, adopting such

regulations as may be necessary to prevent unwise future development, and ensuring compatibility with protection levels provided by the project.

- Comply with applicable provisions of the following:

  - *The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (Public Law 91-646), as amended by Title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17).

  - The Uniform Regulations contained in 49 Code of Federal Regulations 24, *Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs*

  - Section 601 of the Civil Rights Act of 1964 (Public Law 88-352).

  - Army Regulation 600-7, *Nondiscrimination on the basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army.*

  - The Comprehensive Environmental Response, Compensation, and Liability Act (42 U.S. Code 9601-9675).

  - The Preservation of Historical and Archeological Data Act of 1974 (Public Law 93-291).

  - The National Historic Preservation Act of 1980 (Public Law 96-515).

  - National Environmental Policy Act (Public Law 91-90).

  - Endangered Species Act (Public Law 93-205, as amended).

SECTION 7.0 - SUMMARY OF COORDINATION

This Detailed Project Report and Environmental Assessment has been coordinated with all applicable resource agencies and governments, including USFWS, NMFS, WDFW, Washington State Historic Preservation Office, Tribal Historic Preservation Offices, parties interested in cultural resources, the City of Waitsburg, WSDOT, FHWA, Walla Walla County, and the WCFCD. Additionally, it will be distributed to interested Federal, state, and local agencies; special interest groups; and the public for review and comment (see appendix A).

SECTION 8.0 - PUBLIC VIEWS AND COMMENTS

Support for the project from the City of Waitsburg, WCFCD, and WSDOT has been and continues to be strong. Expressed concerns from the citizens of Waitsburg include: Levees developed in existing farmland/pasture land would place limitations on the use of the property; access to water rights in Coppei Creek; and elimination of a bridge of local historic importance. However, everyone agrees that something needs to be done to reduce flood damage from Coppei Creek to the City of Waitsburg.

SECTION 9.0 - CONCLUSIONS AND RECOMMENDATIONS

9.01. CONCLUSIONS.

This Feasibility Study has included an examination of all known structural and non-structural alternatives for meeting the study objective of reducing flood damages to the extent practical for the City of Waitsburg in Walla Walla County along Coppei Creek. Alternative 1 is the most cost-effective alternative in reducing flood damages from Coppei Creek and is the plan favored by the non-Federal Sponsor, WCFCD. This alternative will not cause any significant adverse environmental impacts. The plan is consistent with national policy, statutes, and administrative directives. The study has been reviewed in light of overall public interest, which includes views of the non-Federal Sponsor and interested agencies. It has been concluded that the WCFCD and WSDOT are capable of meeting their financial obligations, and that the public interest would be served by implementation of the recommended plan. It should be noted here that the Coppei Creek Bridge 12 / 666 should be replaced because it has exceeded its life expectancy and is functionally obsolete. It should also be noted that construction of the bridge replacement must occur for the project to provide full flood protection to the City of Waitsburg from Coppei Creek. Levee/floodwall construction without the bridge replacement would not provide the desired flood protection.

9.02. RECOMMENDATIONS.

I recommend the proposed work be authorized and a Federal funding allotment of $1,483,000 (fully funded) be made available to complete construction. The proposed work would reduce Coppei Creek flood damage for the 1-percent chance exceedance to Waitsburg, Washington, as described in this report. Modifications to this report by the Chief of Engineers may be advisable to meet provisions of Section 205 of the 1948 Flood Control Act, as amended. Authorization is subject to cost-sharing and financing requirements as contained in Public Law 99-662, *Water Resources Development Act* (1986), as modified by Public Law 104-303 (1996). Prior to construction, during the plans and specifications stage, the non-Federal Sponsor will be required to sign the project's PCA with the Department of the Army.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the U.S. Congress as proposals for authorization and implementation funding. However, prior to transmittal to the U.S. Congress, the

non-Federal Sponsor, the States, interested Federal agencies, and other parties will be advised of any modifications and afforded an opportunity to comment further.

for Paul R. Wemhoener, PE
Chief, Planning, Programs, and
Project Management Division

SECTION 10.0 - REFERENCES

Army Regulation (AR) 600-7, *Nondiscrimination on the basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army.*

Baker, Loyal, Owner/Publisher, *The Times*, Waitsburg, Washington, personal communication.

40 Code of Federal Regulations (CFR) 1508.20, *Mitigation Measures Should Avoid, Minimize, Rectify, Reduce, or Compensate for Significant Environmental Effects.*

49 CFR 24. *Uniform Relocation Assistance and Real Property Acquisition for Federal and Federally Assisted Programs.*

Engineer Circular 1105-2-211, *The Continuing Authorities Program.*

Engineer Regulation (ER) 405-1-12. *Real Estate Handbook.*

ER 1105-2-100, *Policy and Planning Guidance for Conducting Civil Works Planning Studies.*

Executive Order 11990, *Protection of Wetlands*, May 24, 1977.

Executive Order 11988, *Floodplain Management Guidelines*, May 24, 1977.

Federal Emergency Management Agency. *Flood Insurance Study, City of Waitsburg, Washington, Walla Walla County,* May 3, 1982.

______. *Flood Insurance Study, Walla Walla County, Washington, Unincorporated Areas,* June 1, 1983.

Public Law 80-858, *Flood Control Act of 1948*, Section 205 (as amended).

Public Law 88-352, *Civil Rights Act of 1964*, Section 601.

Public Law 91-90, *National Environmental Policy Act.*

Public Law 91-646, *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended.

Public Law 93-205, Endangered Species Act of 1973, as amended.

Public Law 93-291, *Archeological and Historic Preservation Act (Common name); Historic and Archeological Data Preservation*, 1974.

Public Law 96-515, *National Historic Sites Preservation Act Amendments of 1980.*

Public Law 99-662, *Water Resources Development Act* (October 1986), as modified by Public Law 104-303 (October 1996).

Public Law 100-17, *Surface Transportation and Uniform Relocation Assistance Act of 1987*, Title IV.

Public Law 104-303, *Water Resources Development Act of 1996.*

Public Law 106-541, *Water Resource Development Act of 2000.*

Technical Advisory FHWA T 6640.8A, *Guidance for Preparing and Processing Environmental and Section 4(f) Documents.*

U.S. Army Corps of Engineers, Walla Walla District. *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report*, October 1997.

______. Hydrology Section, *Floodplain Management Services, Special Study, Coppei Creek, City of Waitsburg and Walla Walla County, Washington*, April 2001.

United States Code, 42 USC 9601-9675, *Comprehensive Environmental Response, Compensation, and Liability Act.*

U.S. Department of Agriculture, Soil Conservation Service. *Soil Survey, Walla Walla County Washington*, February 1964.

U.S. Water Resources Council. Bulletin #17A, *Guidelines for Determining Flood Flow Frequency*, June 1977.

______. *Principles and Guidelines.* 1983.

Walla Walla County Regional Planning and Economic and Engineering Services, Inc., *Comprehensive Flood Hazard Management Plan (CFHMP), Walla Walla County, Washington,* Final Report, January 2000.

Washington Administrative Code, 173-201A, *Water Quality Standards.*

SECTION 11.0 - LIST OF ACRONYMS

CEQ	Council of Environmental Quality
CFHMP	Comprehensive Flood Hazard Management Plan
Corps	U.S. Army Corps of Engineers
°C	Degrees centigrade
°F	Degrees Fahrenheit
DOE	Washington Department of Ecology
EIS	Environmental Impact Statement
EQ	Environmental Quality
ESA	Endangered Species Act
FHWA	Federal Highways Administration
HEC	Hydrologic Engineering Center
LERRD	Lands, Easements, Rights of Way, Relocations, and Disposal areas
NED	National Economic Development Act
NEPA	National Environmental Policy Act
NGVD 29	National Geodetic Vertical Datum 1929
NMFS	National Marine Fisheries Service
O&M	Operation and Maintenance
OSE	Other Social Effects
PCA	Project Cooperation Agreement
RD	Regional Development
U.S. 12	U.S. Route 12
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WCFCD	Waitsburg Coppei Flood Control District
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation

SHEETS

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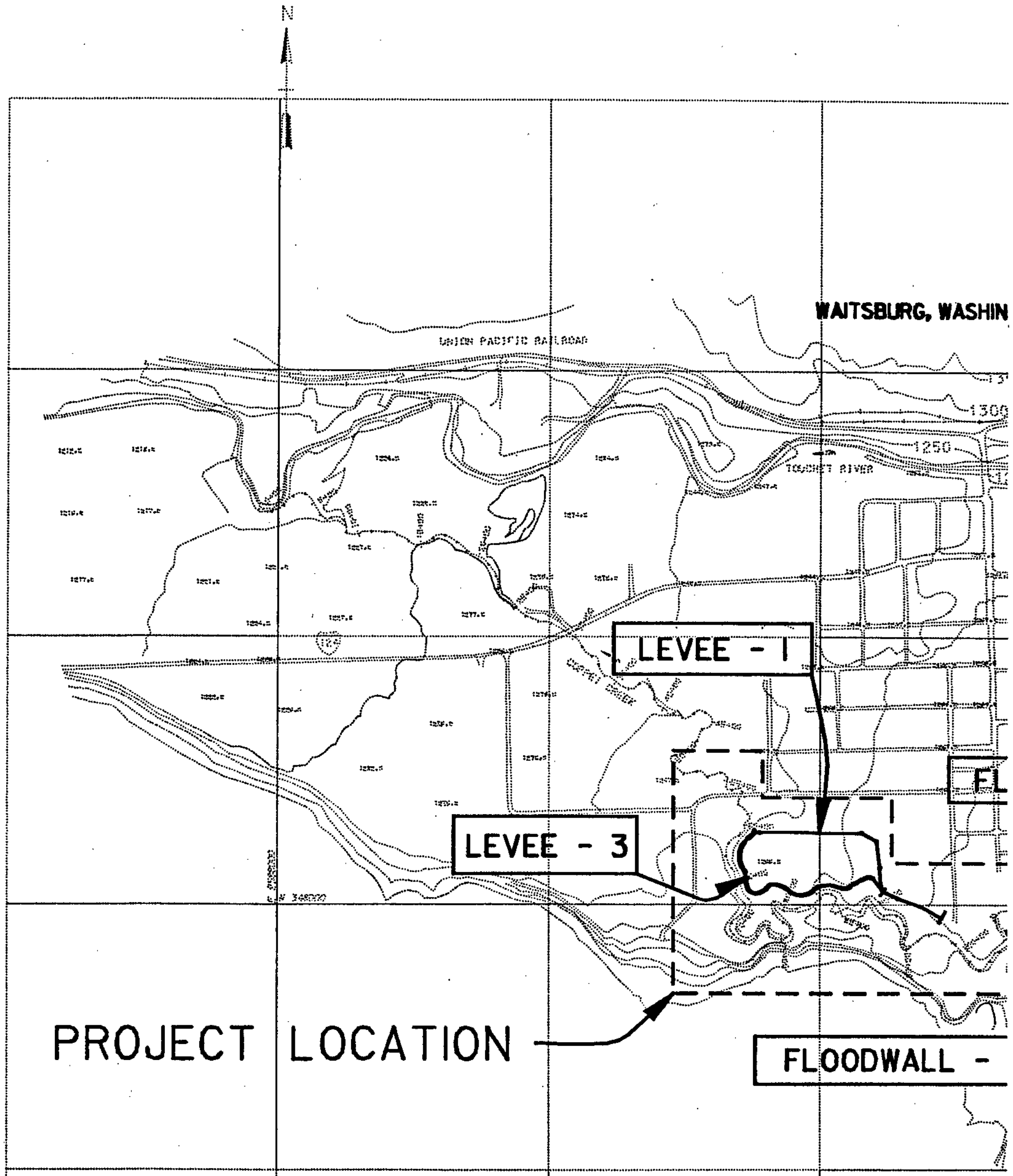

LOCATION MAP - COPPEI CREEK

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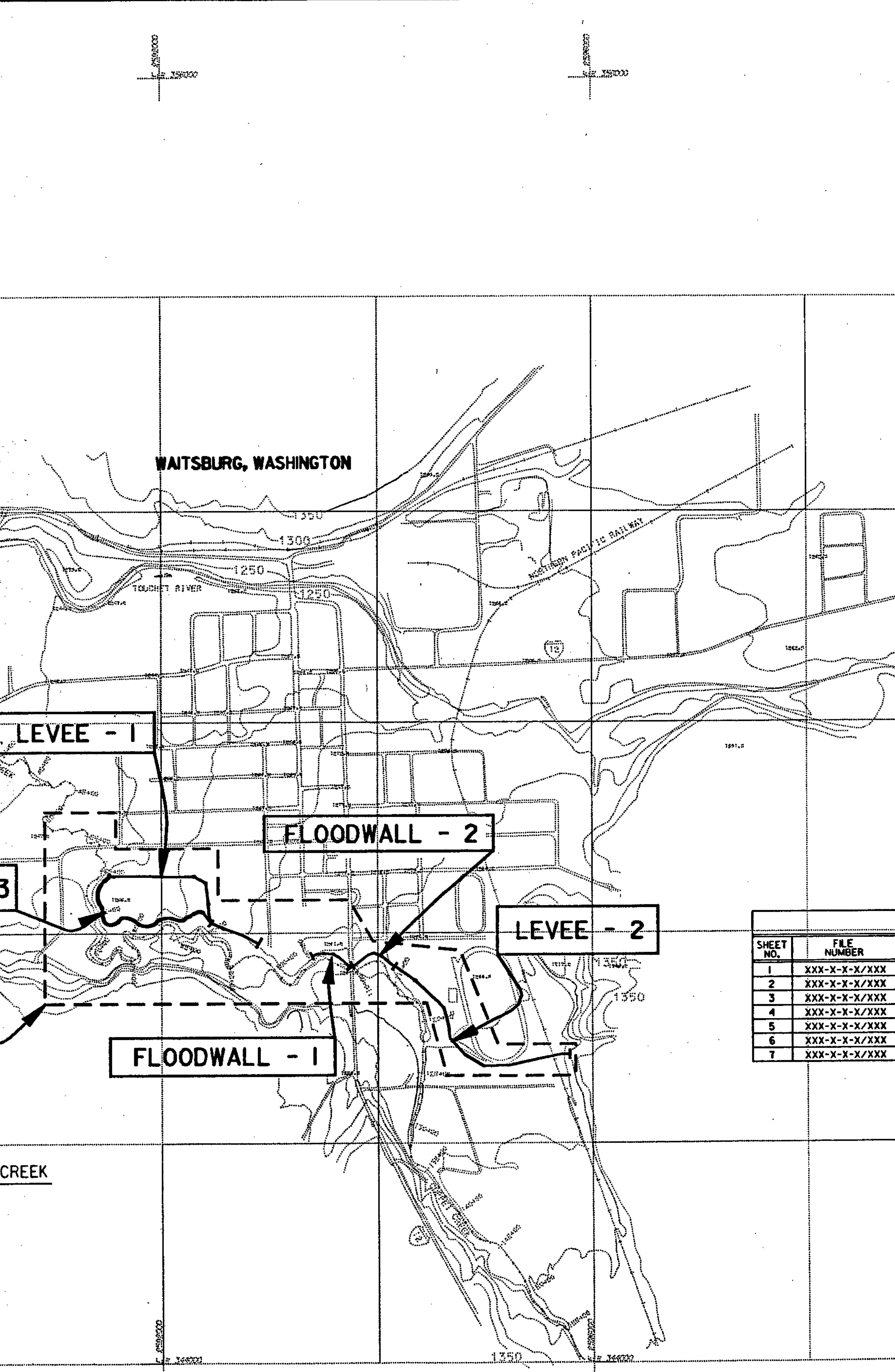

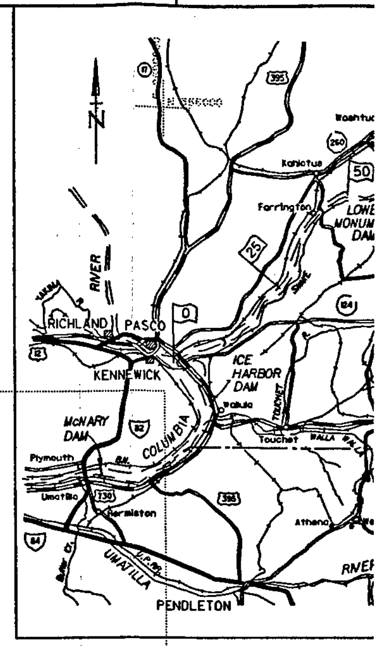

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2	XXX-X-X-X/XXX	WSTB02.DGN	OVERALL PLAN
3	XXX-X-X-X/XXX	WSTB03.DGN	SETBACK LEVEE 1 & 3 + CONCR
4	XXX-X-X-X/XXX	WSTB04.DGN	SETBACK LEVEE 2 + CONCRETE
5	XXX-X-X-X/XXX	WSTB05.DGN	LEVEE AND WALL DETAILS
6	XXX-X-X-X/XXX	WSTB06.DGN	BRIDGE 12/666 REPLACEMENT -
7	XXX-X-X-X/XXX	WSTB07.DGN	TEMPORARY DETOUR BRIDGE &

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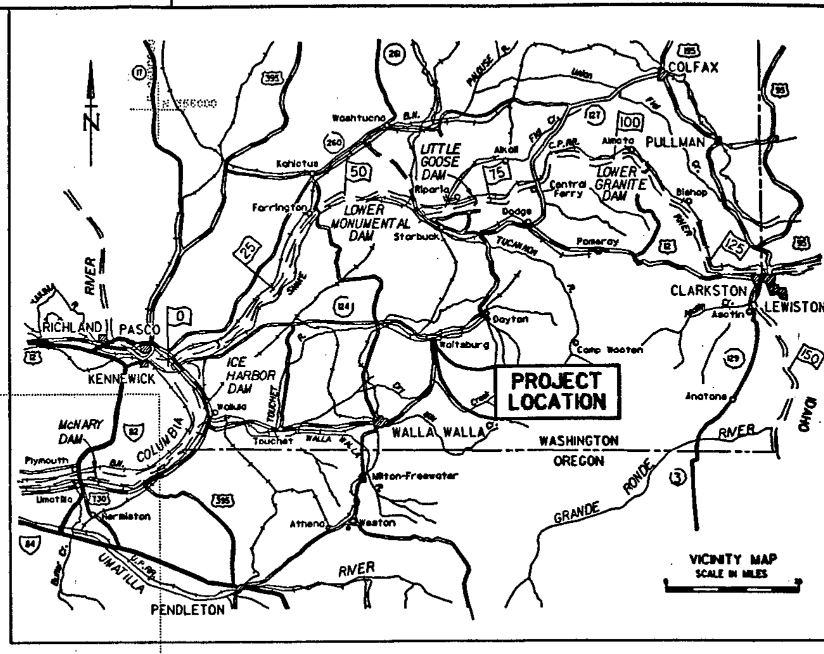

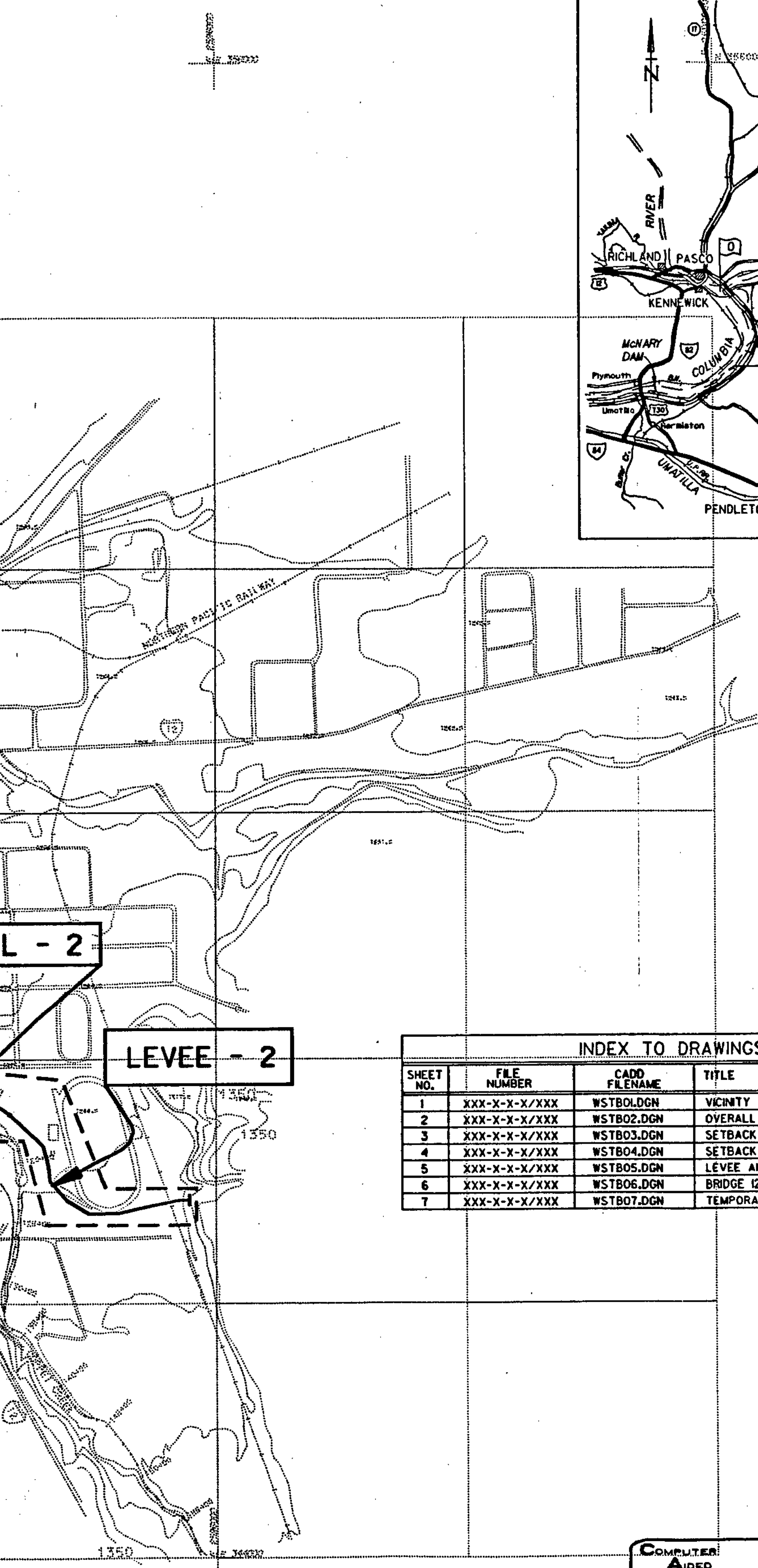

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3	XXX-X-X-X/XXX	WSTB03.DGN	SETBACK LEVEE 1 & 3 + CONCRETE WALL 1- PLAN AND PROFILES
4	XXX-X-X-X/XXX	WSTB04.DGN	SETBACK LEVEE 2 + CONCRETE WALL 2 - PLAN AND PROFILES
5	XXX-X-X-X/XXX	WSTB05.DGN	LEVEE AND WALL DETAILS
6	XXX-X-X-X/XXX	WSTB06.DGN	BRIDGE 12/666 REPLACEMENT - PLAN AND PROFILE
7	XXX-X-X-X/XXX	WSTB07.DGN	TEMPORARY DETOUR BRIDGE & ROAD SECTION - ELEVATION AND SECTION

REVISION	DATE	DESCRIPTION	CHKD.	APPR.

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WALLA WALLA, WASHINGTON

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MEYER — DRAWN BY
FINK — CHECKED BY
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WALLA WALLA RIVER BASIN
COPPEI CREEK FLOOD CONTROL STUDY
VICINITY OF WAITSBURG, WASHINGTON

VICINITY LOCATION MAPS
AND INDEX TO DRAWINGS

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3. REPORT TYPE AND DATES COVERED
Detailed Project Report and Environmental Assessment

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6. AUTHOR(S)
Walla Walla District Corps of Engineers

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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201 North Third Avenue
Walla Walla Washington 99362-1876

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Washington State Department of Transportation
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11. SUPPLEMENTARY NOTES

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12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

In 1996, Waitsburg Washington experienced severe flooding from Coppei Creek which forms the south city boundary. This detailed project report and environmental assessment documents the feasibility level analysis for a Section 205 Flood Control to address that flooding. Several alternatives were evaluated. The recommended plan consists of replacing an existing highway bridge, and construction of a combination floodwall and set back levee on the Coppei Creek right (north) bank.

One unique aspect of this project is that the Washington State Department of Transportation will perform the bridge replacement with state and Federal Highway Administration funds. The Corps will perform all work for the floodwalls and levees under the Continuing Authorities Program in a cost share effort with the Waitsburg Coppei Flood Control District.

14. SUBJECT TERMS
Flood control, Section 205, Continuing Authority Program, levee, floodwall, bridge, bridge replacement, non-federal sponsor, environmental assessment, critical habitat, Endangered Species Act, real estate, economic analysis,

15. NUMBER OF PAGES
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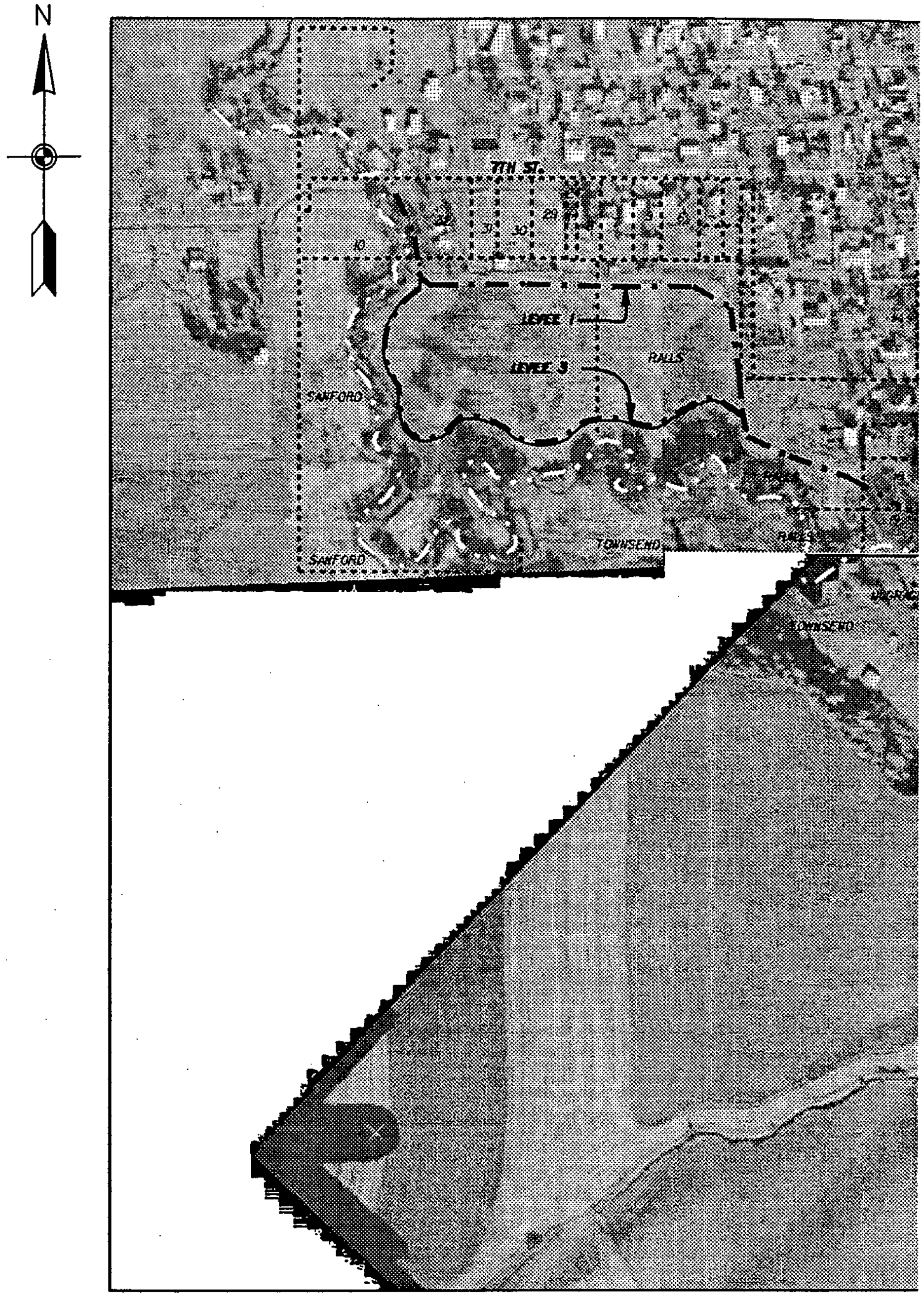

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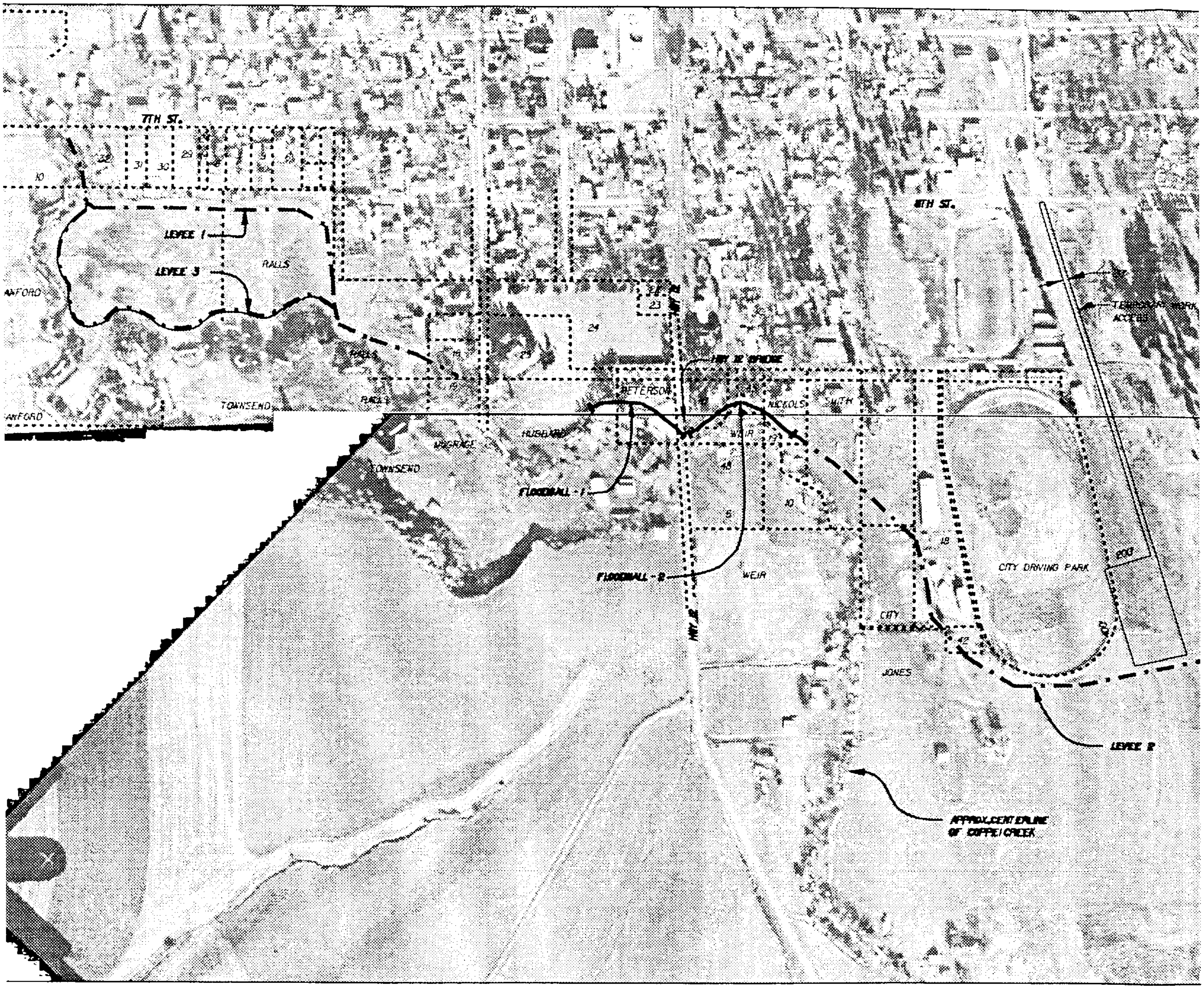

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℄ COPPEI CREEK

PROPERTY LINES

NOTES:

1. FOR TEMPORARY DETOUR FOR BRIDGE REPLACEMENT, SEE PLATE 7
2. FOR STAGING AREAS SEE APPENDIX D, REAL ESTATE PLANNING MAP - D-A-20

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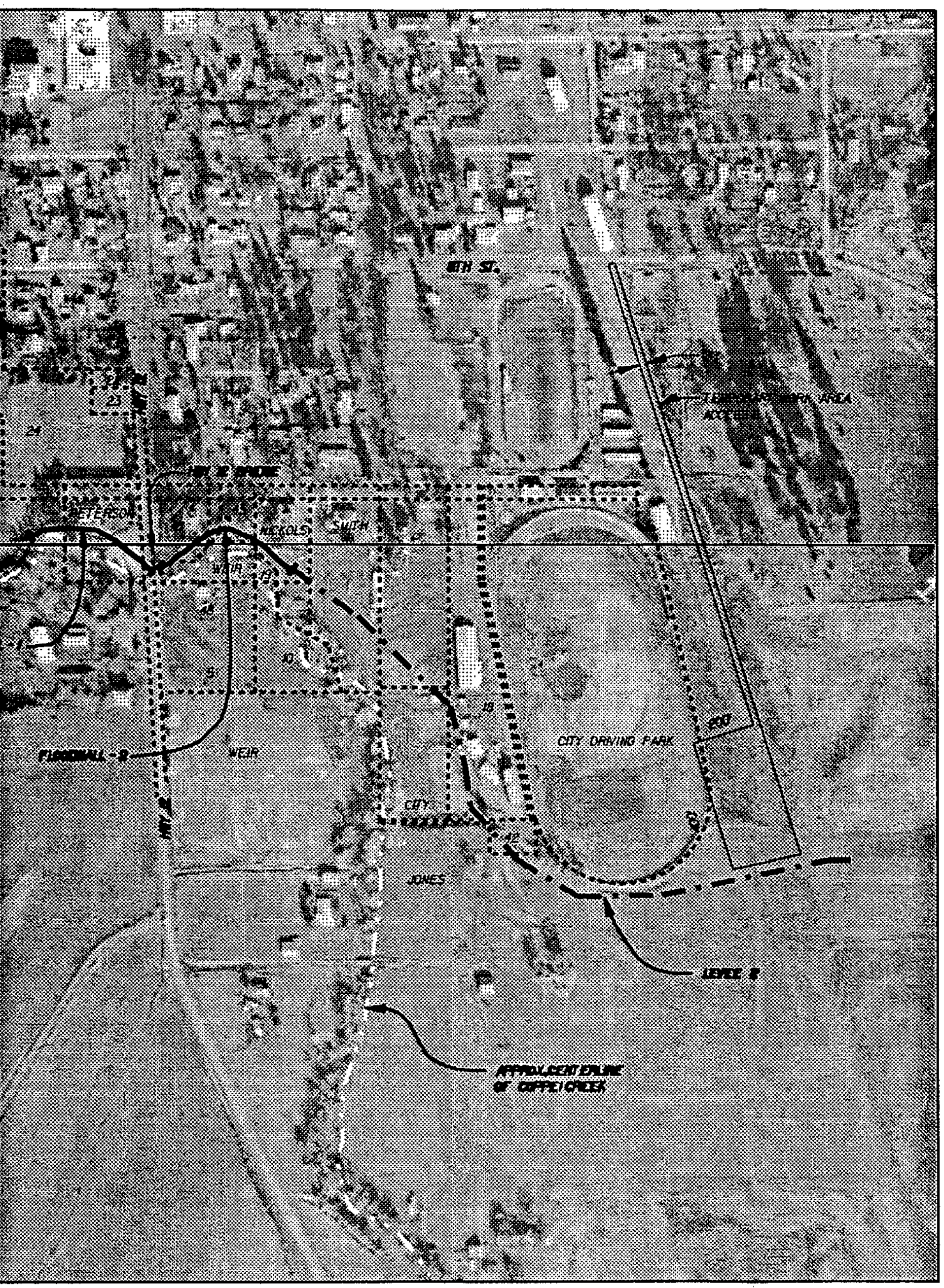

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NOTES:

1. FOR TEMPORARY DETOUR FOR BRIDGE REPLACEMENT, SEE PLATE 7

2. FOR STAGING AREAS SEE APPENDIX D, REAL ESTATE PLANNING MAP - D-A-20

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COPPEI CREEK FLOOD CONTROL STUDY
VICINITY OF WAITSBURG, WASHINGTON

OVERALL PLAN

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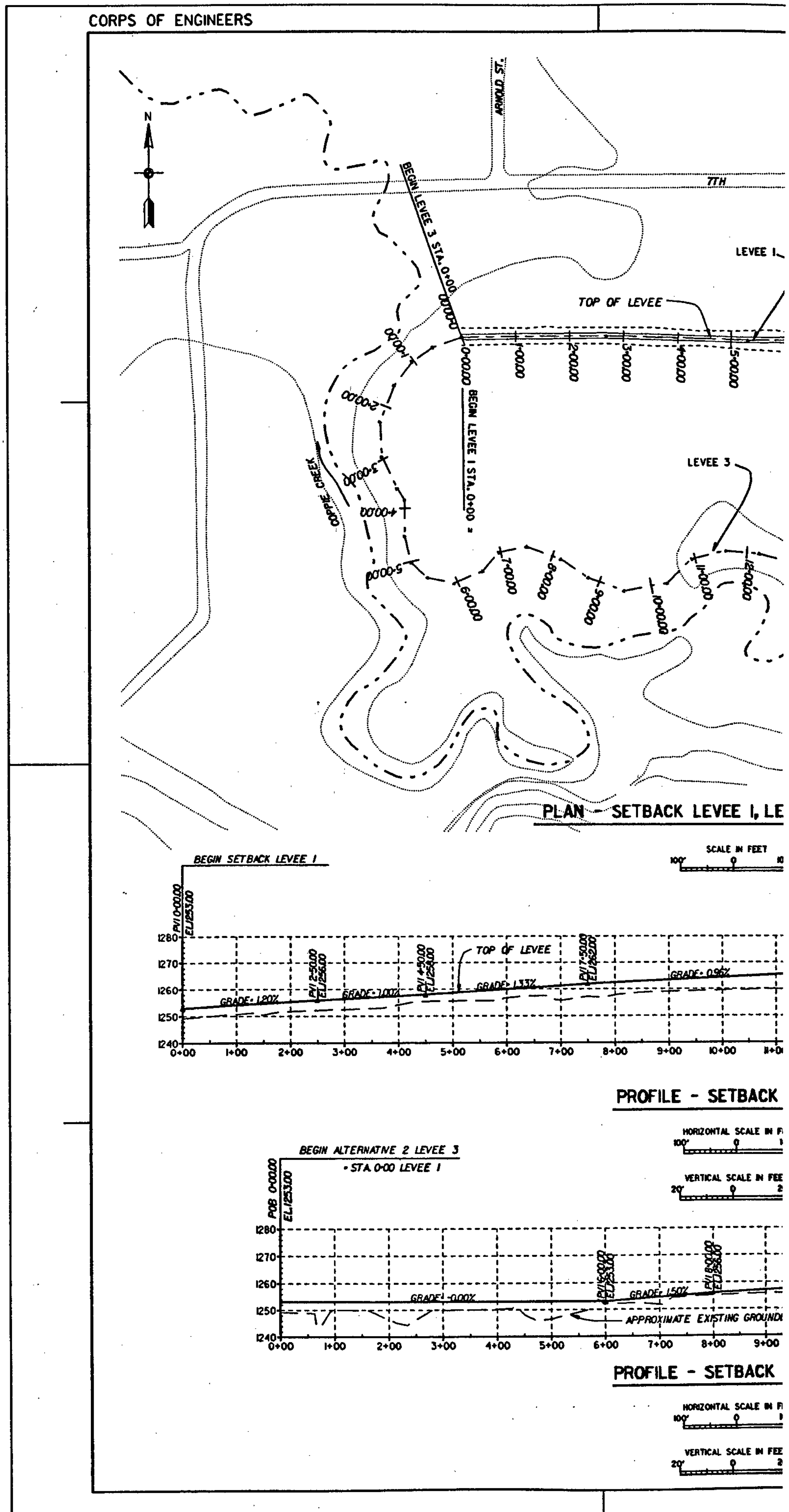
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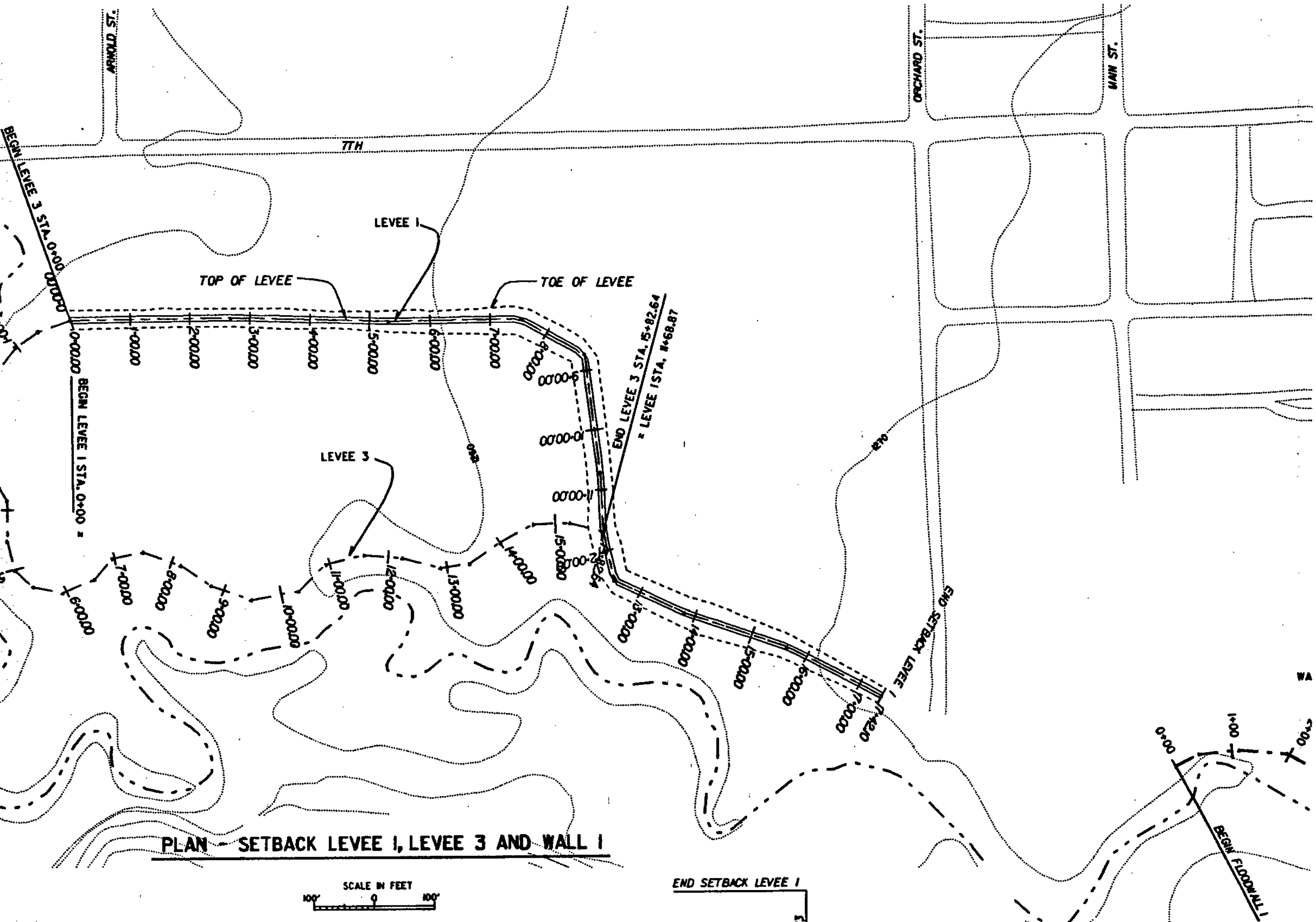

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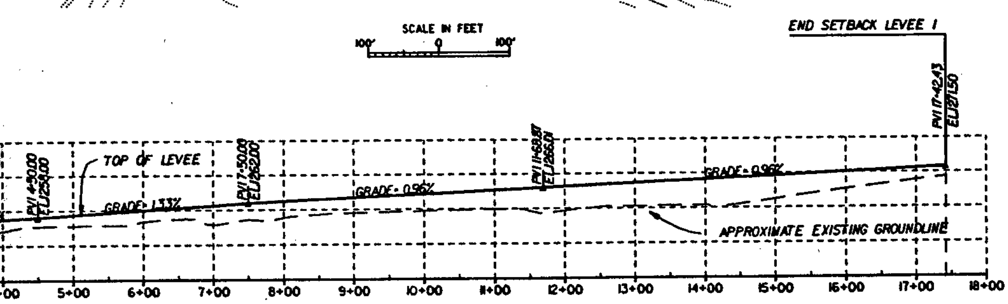

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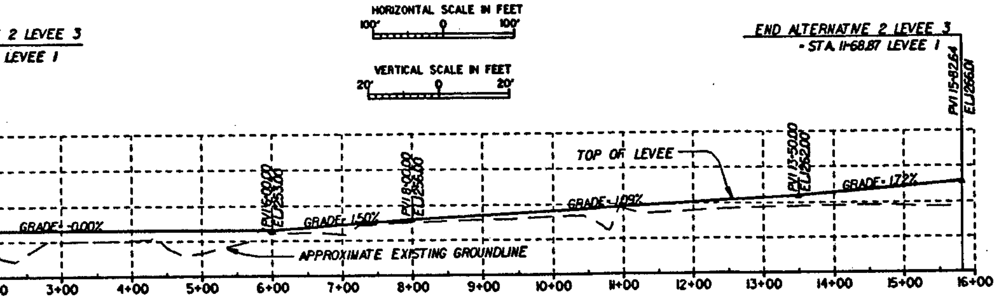

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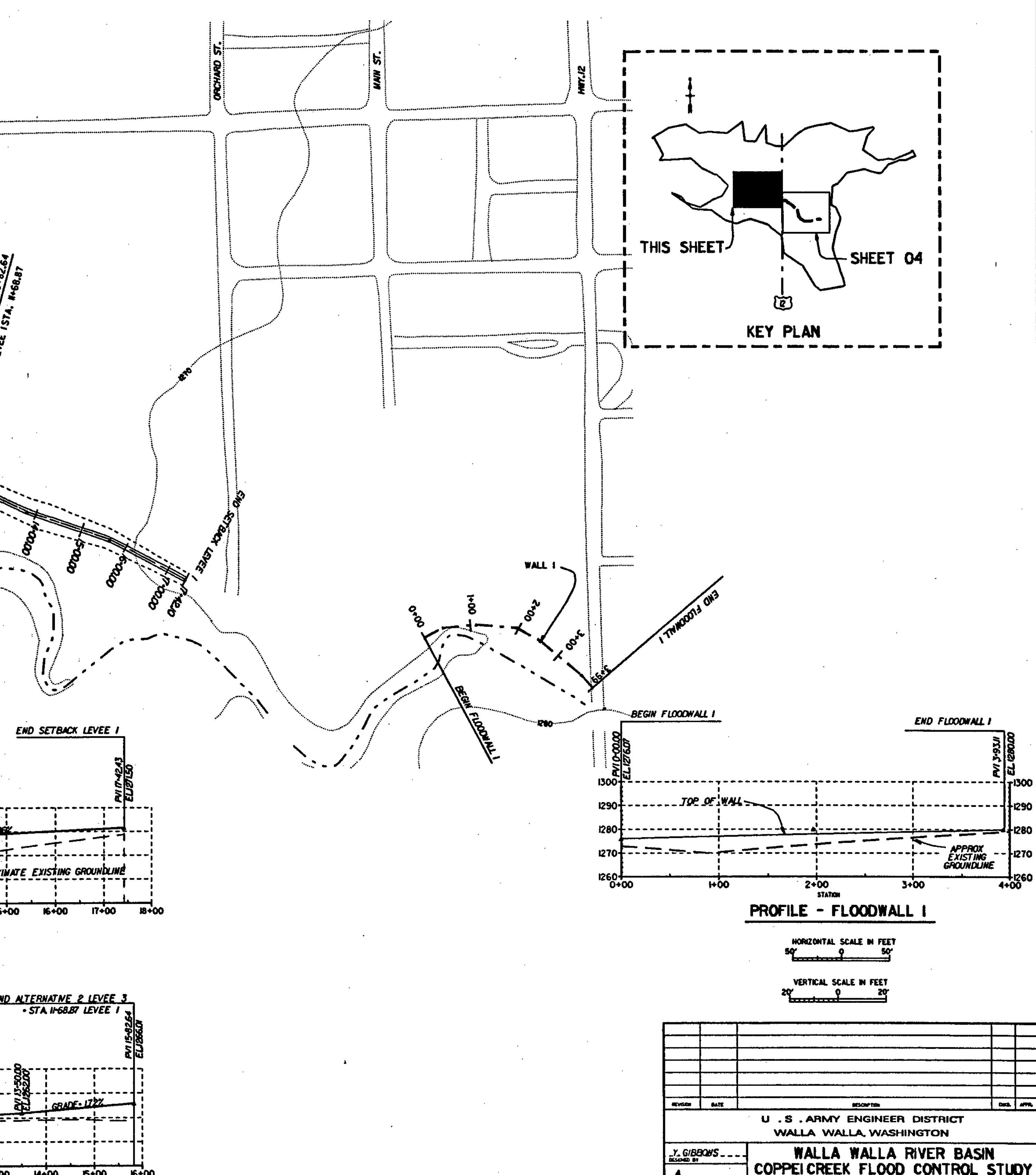

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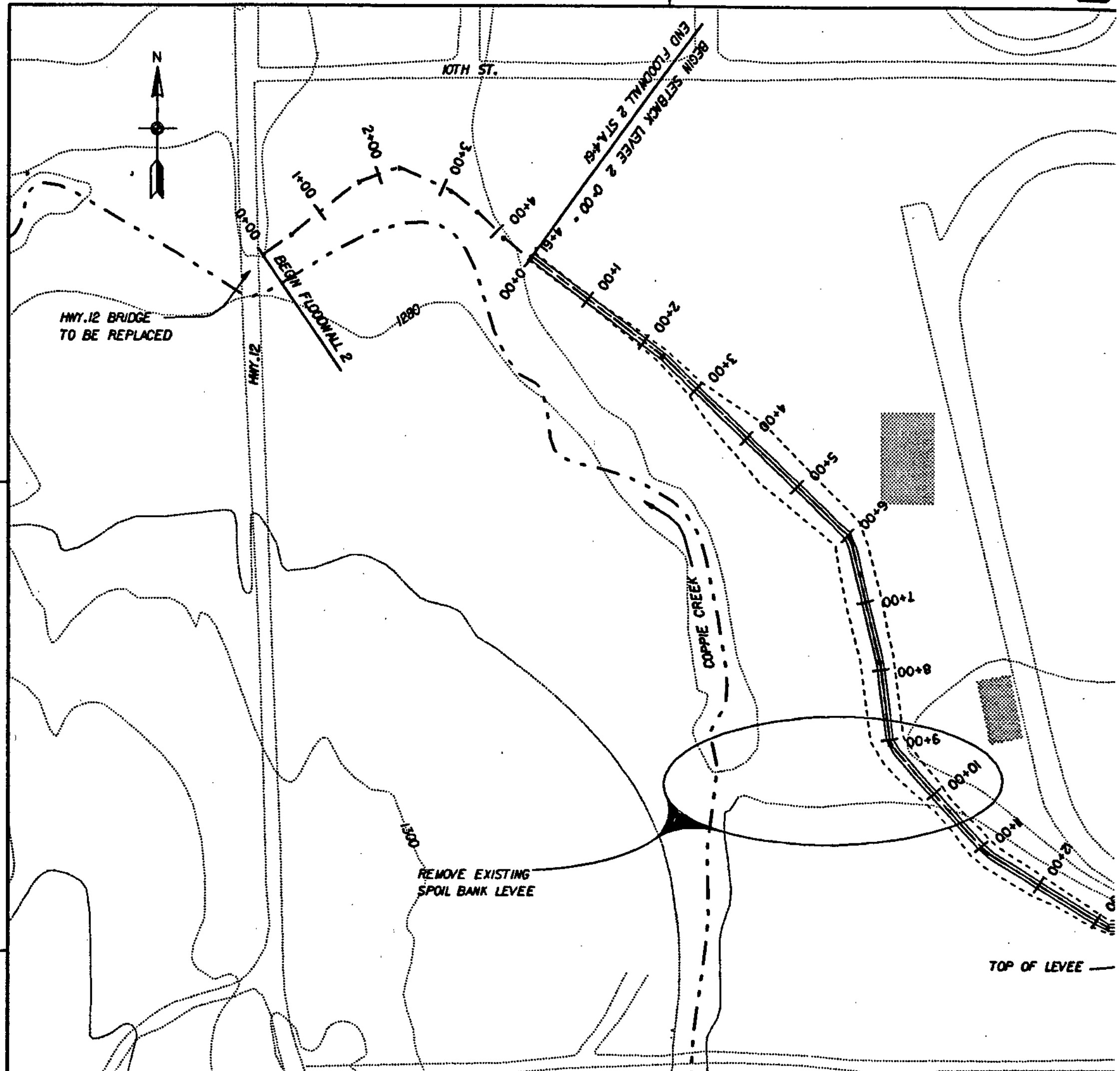

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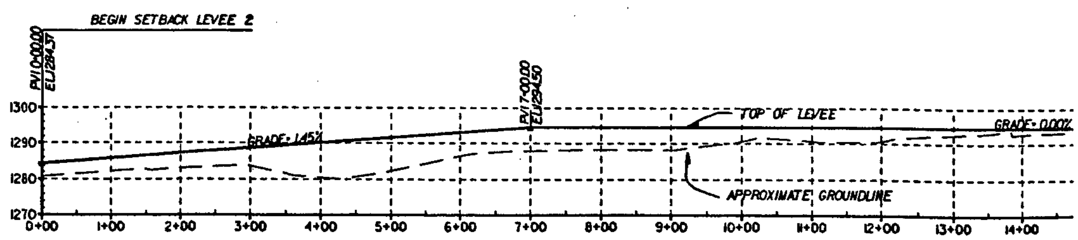

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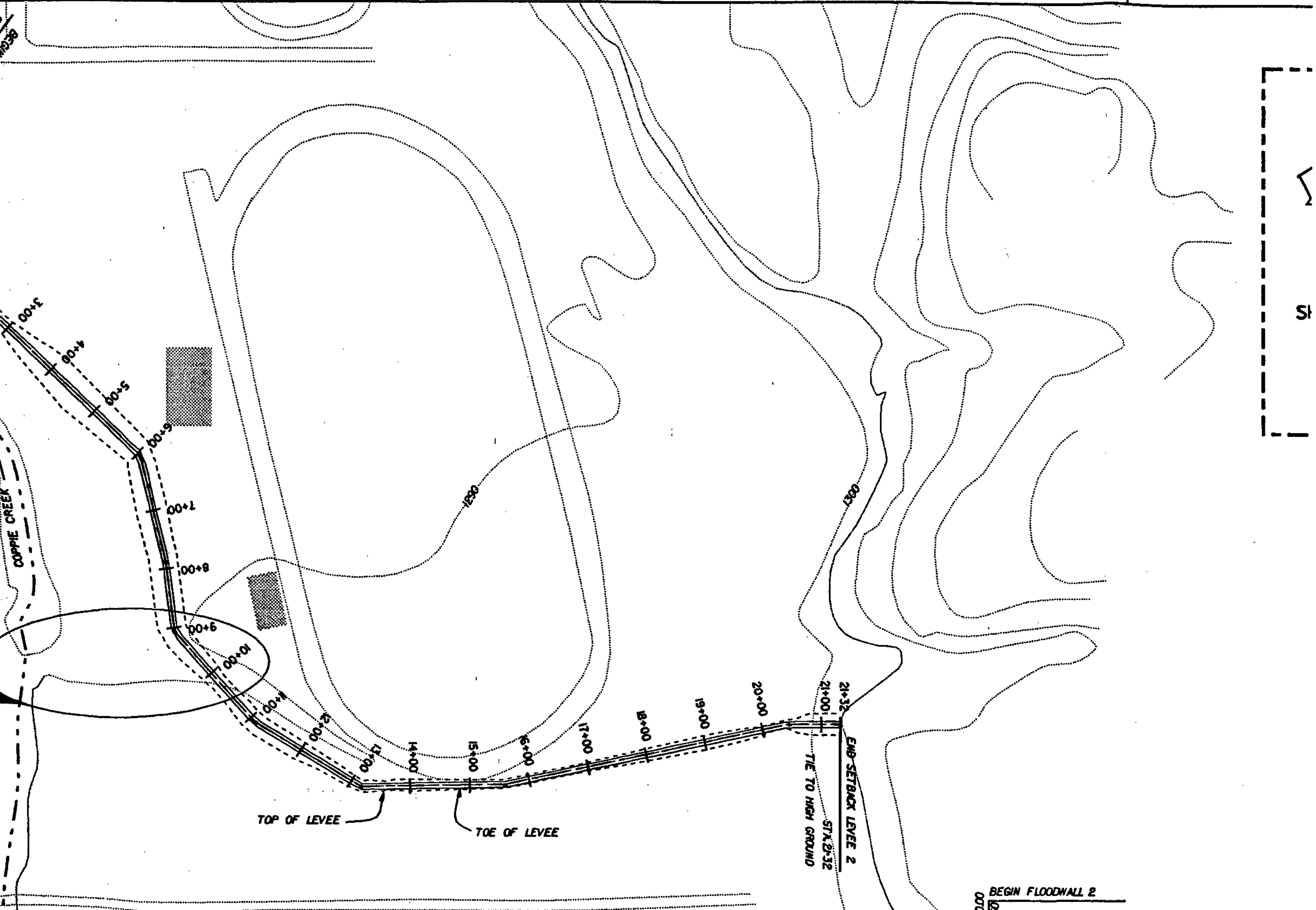

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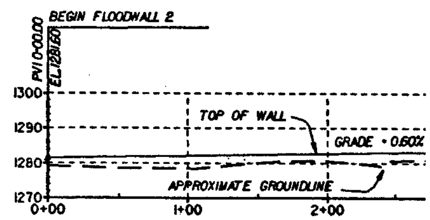

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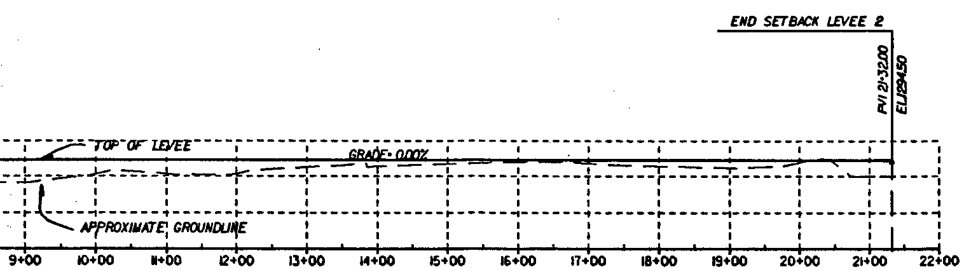

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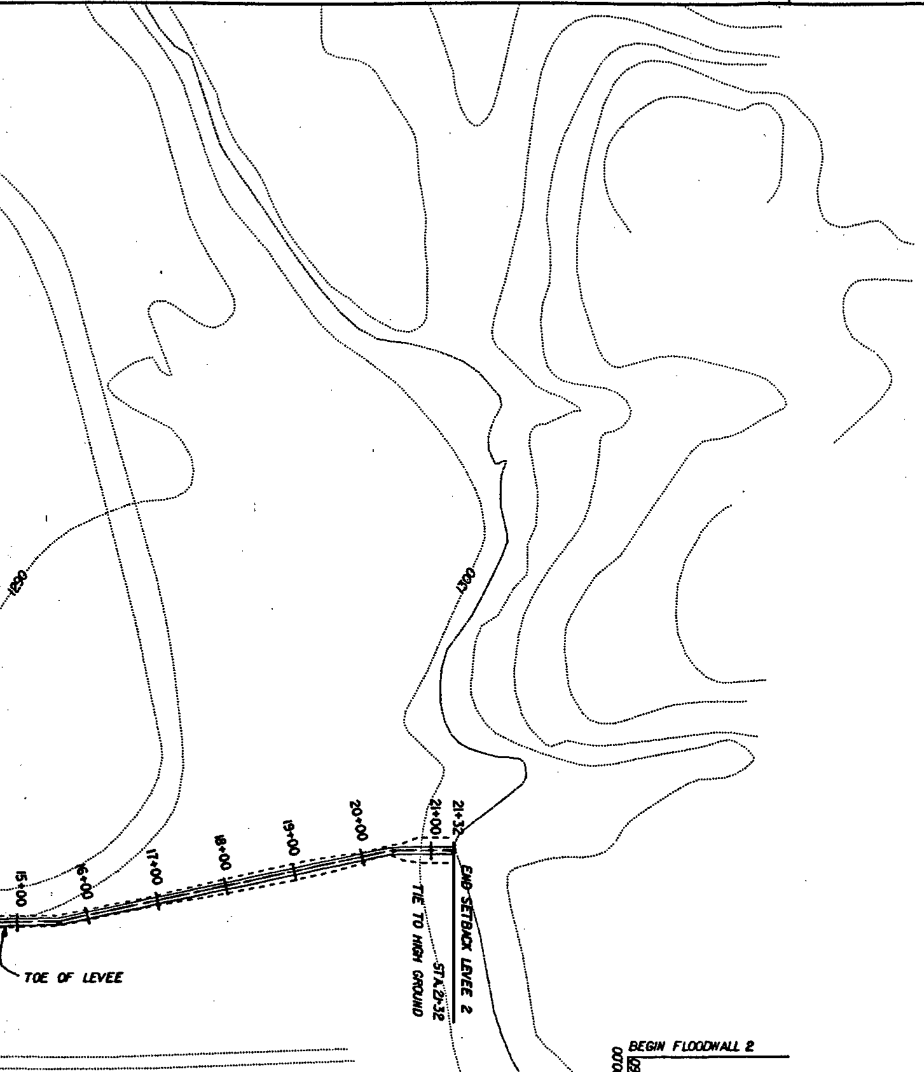

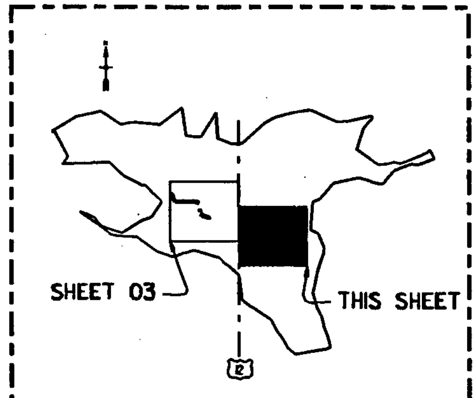

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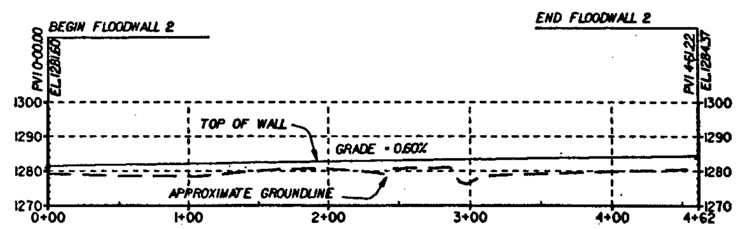

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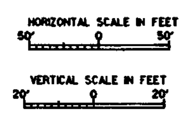

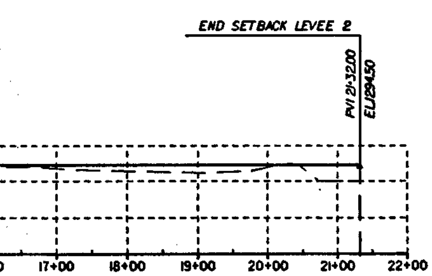

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WALLA WALLA RIVER BASIN
COPPEI CREEK FLOOD CONTROL STUDY
VICINITY OF WAITSBURG, WASHINGTON

SETBACK LEVEE 2 + FLOODWALL 2
PLAN AND PROFILES

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REFERENCE FILES ATTACHED
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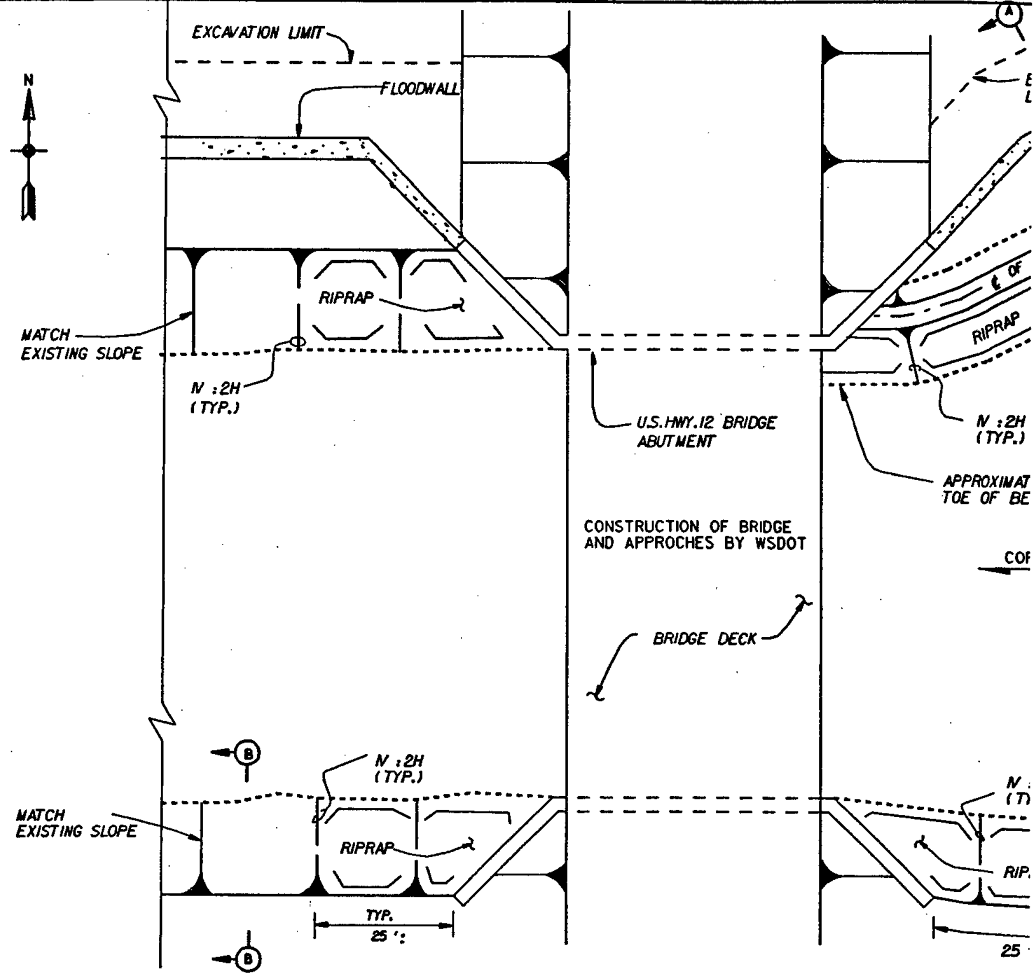
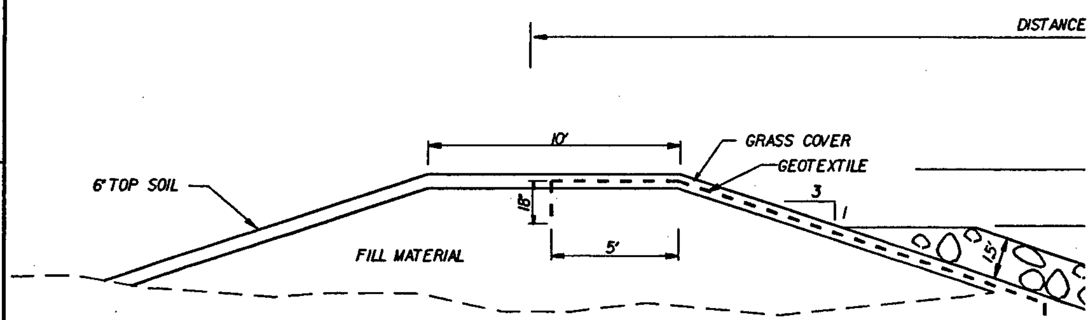
CORPS OF ENGINEERS



COPPEI CREEK BRIDGE/SET FLOODWALL TIE-IN

NTS



TYPICAL SETBACK LEVEE CROSS SECTION

SCALE IN FEET

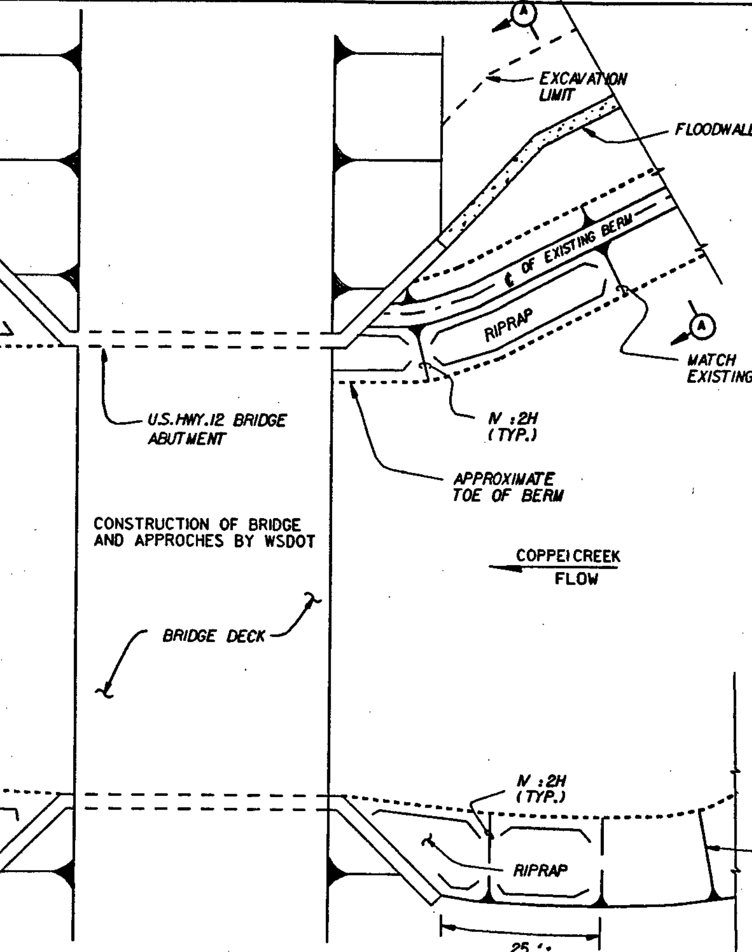
NOTES:

1. TH 3

2. EX TC LE

3. RI RI

1



EK BRIDGE/SET FLOODWALL TIE-IN

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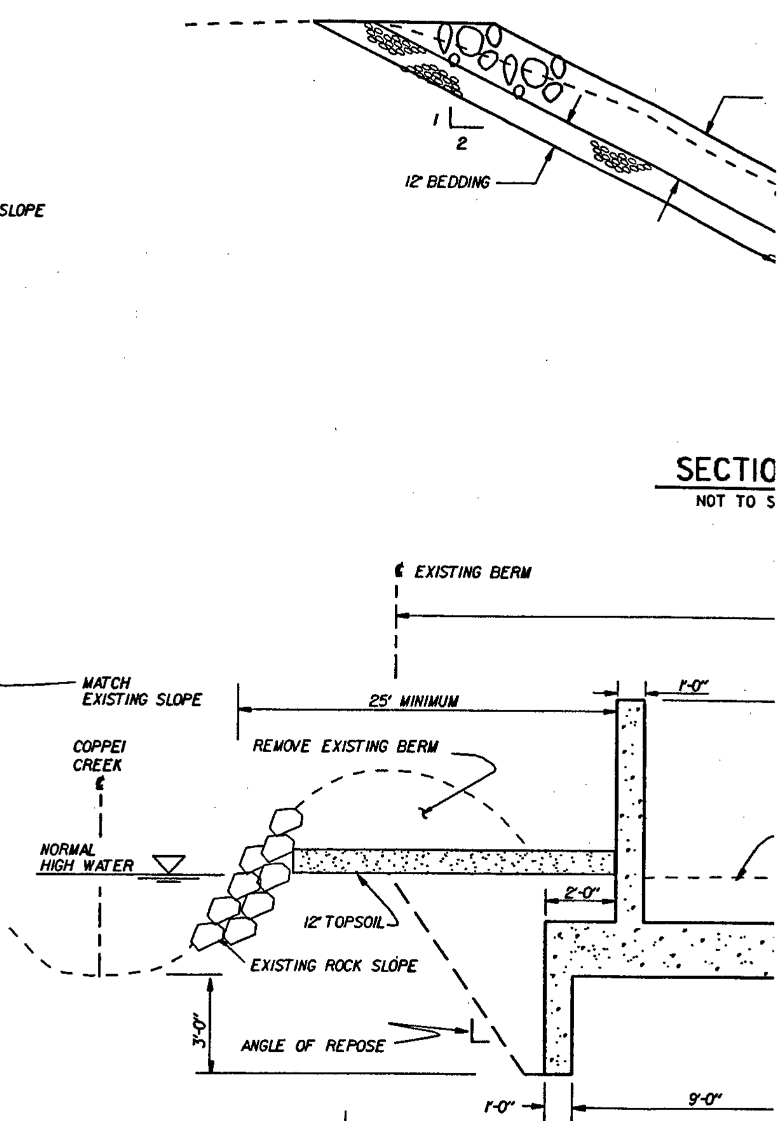
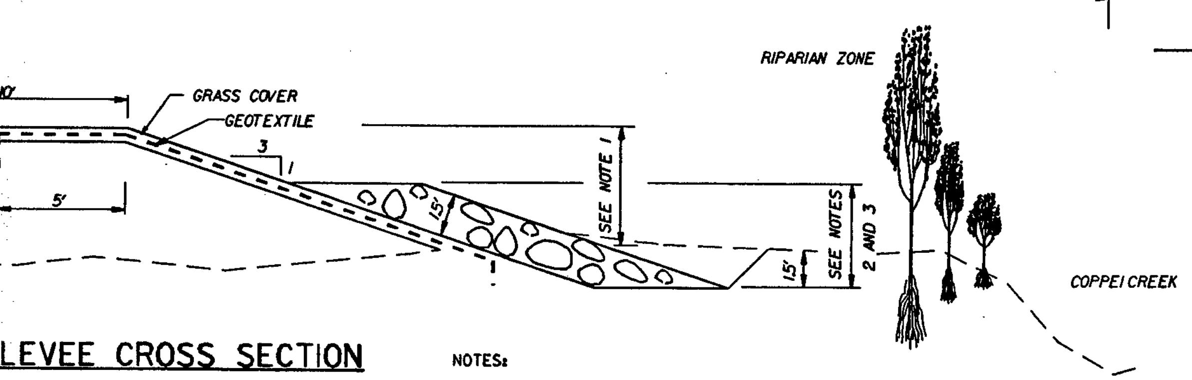


SECTION A - FL

NOT TO SCALE
RIGHT BANK UPSTREA



LEVEE CROSS SECTION

CALE IN FEET
2' 4' 6'

NOTES:

1. THE HEIGHT OF LEVEE VARIES FROM 3 FEET TO 6 FEET.
2. EXTEND RIPRAP 3 FEET FROM TOE INVERT OR TO THE TOP OF LEVEE WHICH EVER IS LESS.
3. RIPRAP FOR LEVEE 1- STA. 12+00 TO 17+00
   RIPRAP FOR LEVEE 2 - STA. 0+00 TO 13+00

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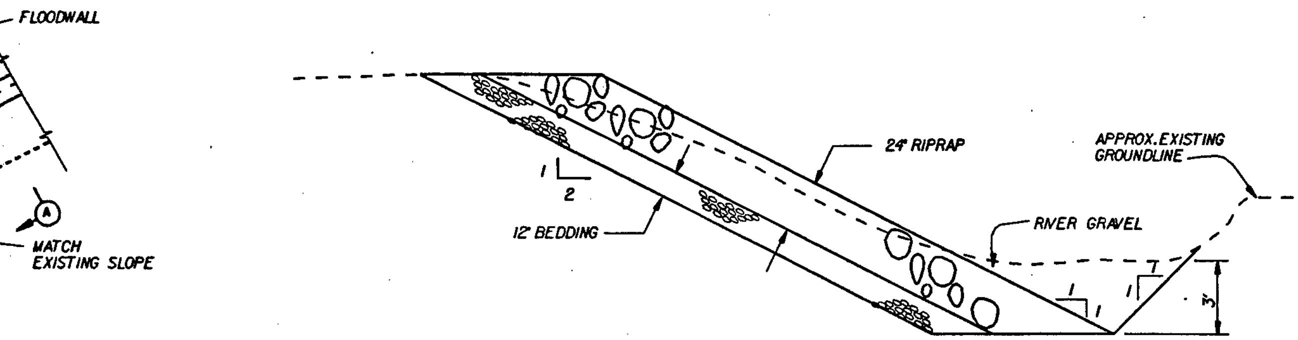

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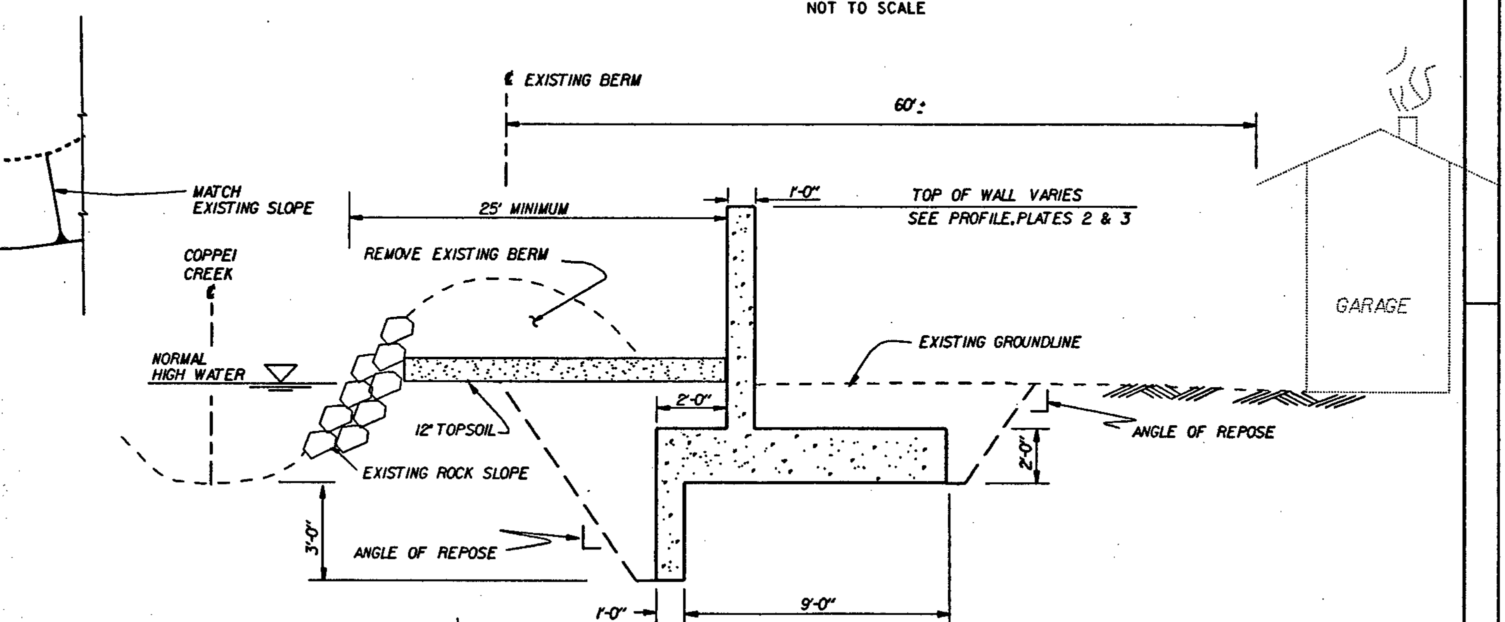

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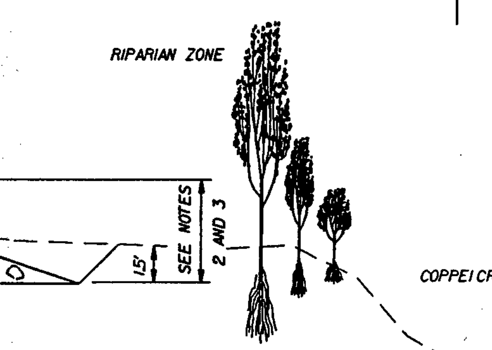
RIGHT BANK UPSTREAM



LEVEE VARIES FROM
FEET.

3 FEET FROM
TO THE TOP OF
ER IS LESS.

EE 1 - STA. 12+00 TO 17+00
EE 2 - STA. 0+00 TO 13+00

REVISION	DATE	DESCRIPTION	CHKD.	APPR.

U. S. ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED BY KGO/MEYER
DRAWN BY FINK
CHECKED BY
SUPERVISED
CHIEF
SUBMITTED
CHIEF
RECOMMENDED
CHIEF

WALLA WALLA RIVER BASIN
COPPEI CREEK FLOOD CONTROL STUDY
VICINITY OF WAITSBURG, WASHINGTON

LEVEE AND FLOODWALL DETAILS

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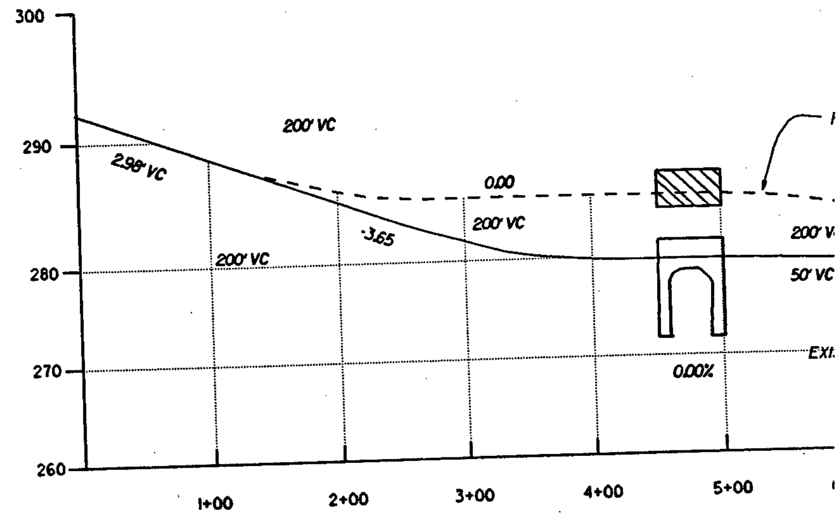
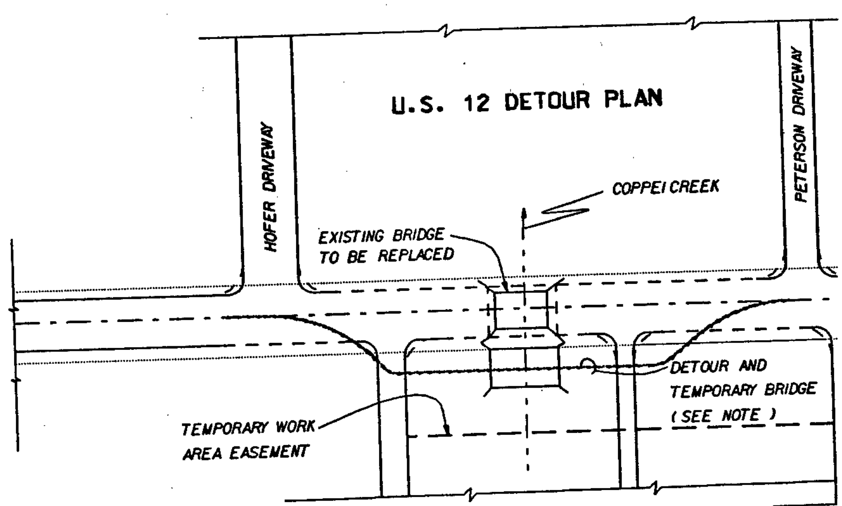


PROFILE - RECONSTRUCTED U.S. 12 ROAD



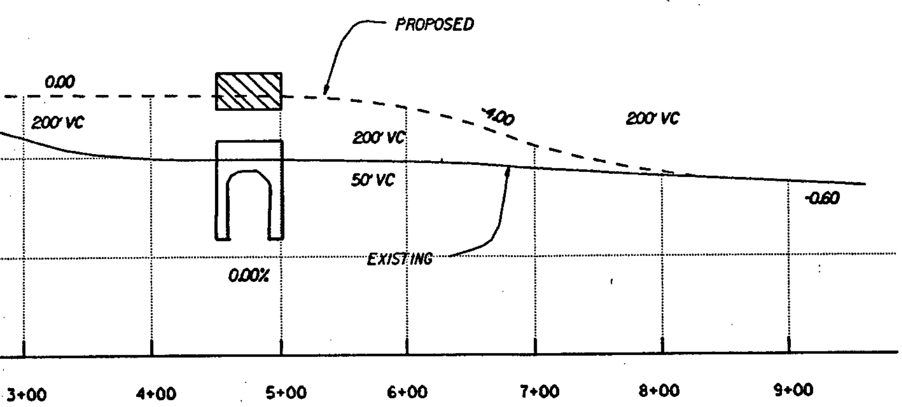
PLAN

NTS

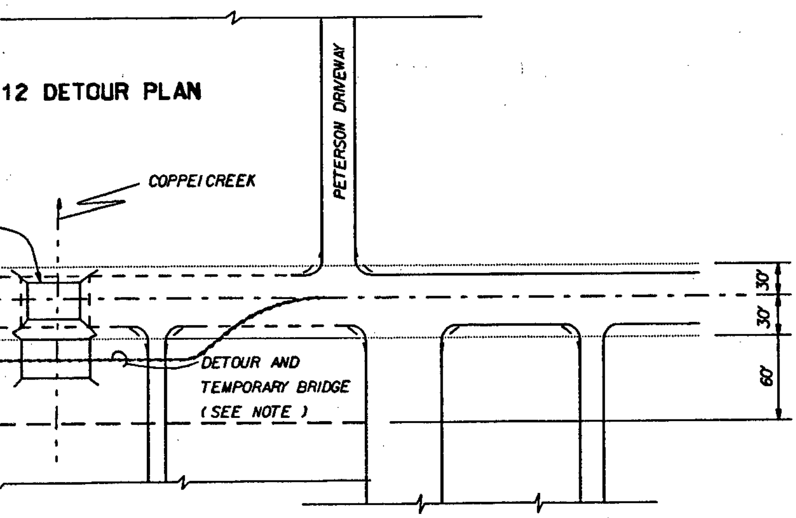
LEGEND

— - —	℄ U.S. 12
———	DETOUR
— - - -	COPPEI CREEK
———	EXISTING
... ...	PROPOSED
....	RIGHT OF WAY

1



STRUCTED U.S. 12 ROAD AND BRIDGE



PLAN

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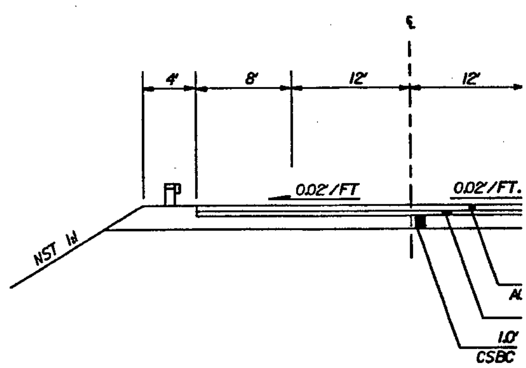
NOTE:

DETOUR AND TEMPORARY BRIDGE MAY BE LOCATED ON EITHER SIDE OF THE EXISTING BRIDGE.



TYPICAL U.S. 12 ROADW

NOT TO SCALE

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REFERENCE FILES ATTACHED

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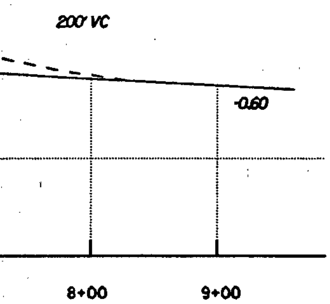

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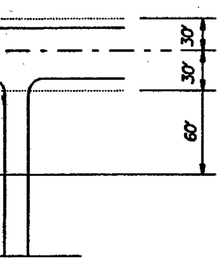

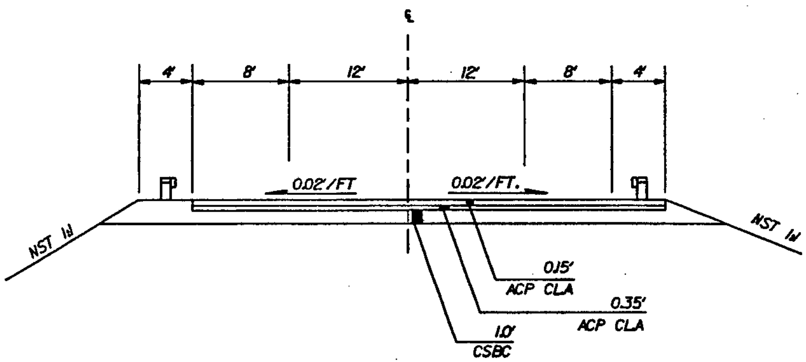

TYPICAL U.S. 12 ROADWAY SECTION

NOT TO SCALE

…TEMPORARY BRIDGE MAY BE LOCATED
…E OF THE EXISTING BRIDGE.

REVISION	DATE	DESCRIPTION	CHK.	APPR.

U . S . ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED BY: FINK
DRAWN BY: ORTH
CHECKED BY: FINK
SUPERVISION:
CHIEF
SUBMITTED:
CHIEF
RECOMMENDED:
CHIEF

WALLA WALLA RIVER BASIN
COPPEI CREEK FLOOD CONTROL STUDY
VICINITY OF WAITSBURG, WASHINGTON

COPPEI CREEK BRIDGE 12/666 REPLACEMENT
PLAN, PROFILE, AND SECTION

APPROVED: DATE:

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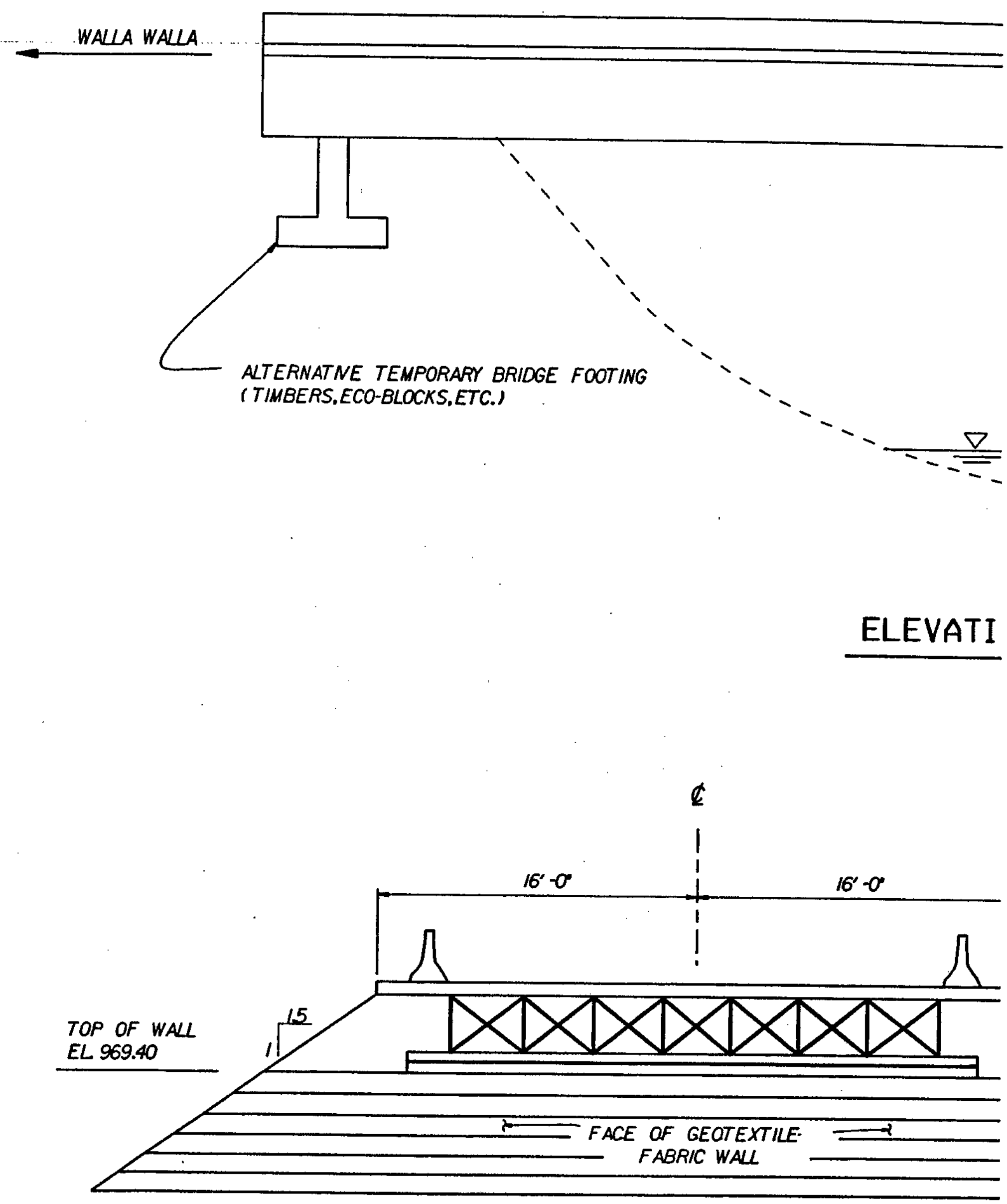
CORPS OF ENGINEERS



SECTION A - TEMPORARY DETOUR BRID

NOT TO SCALE

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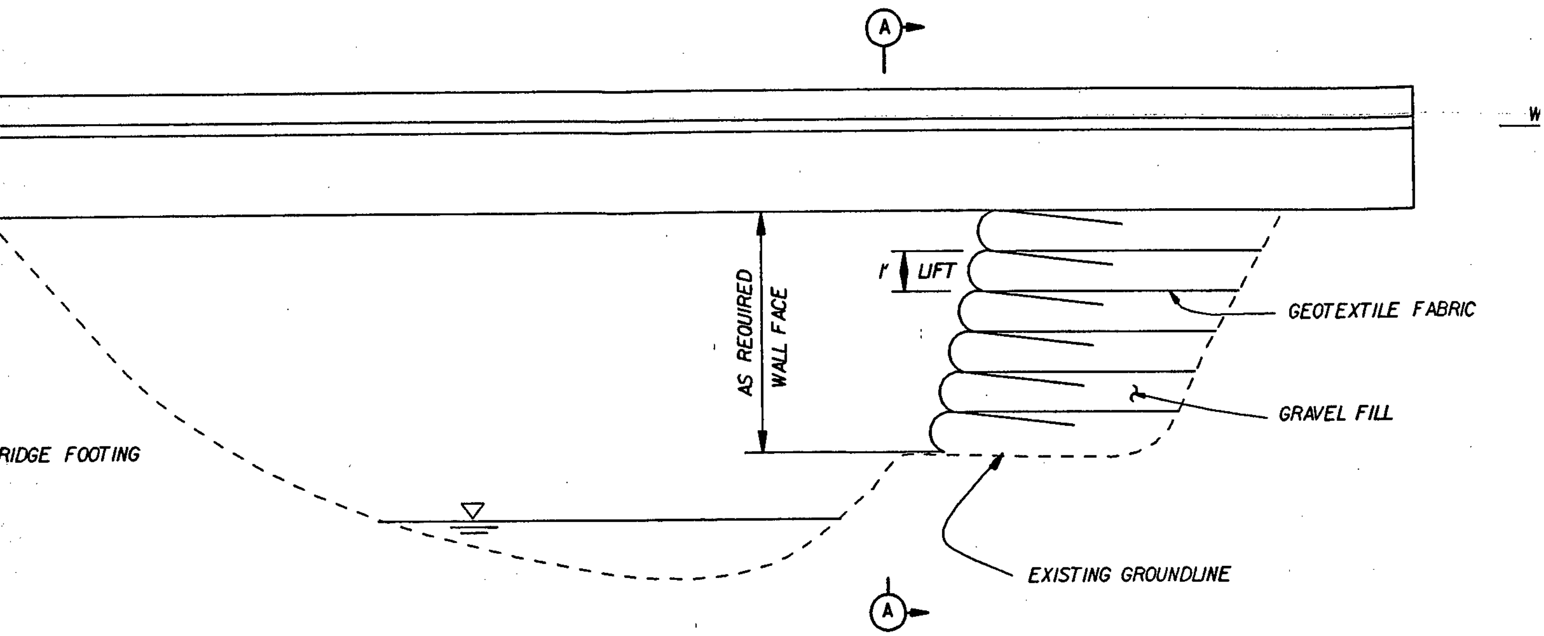

ELEVATION - TEMPORARY DETOUR BRIDGE

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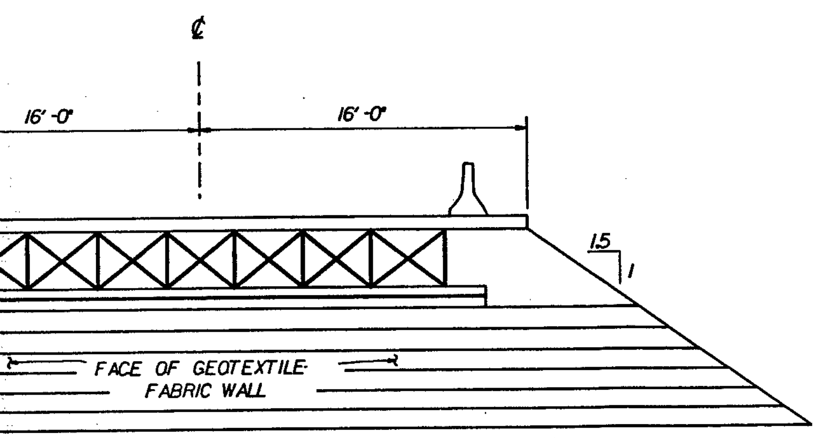


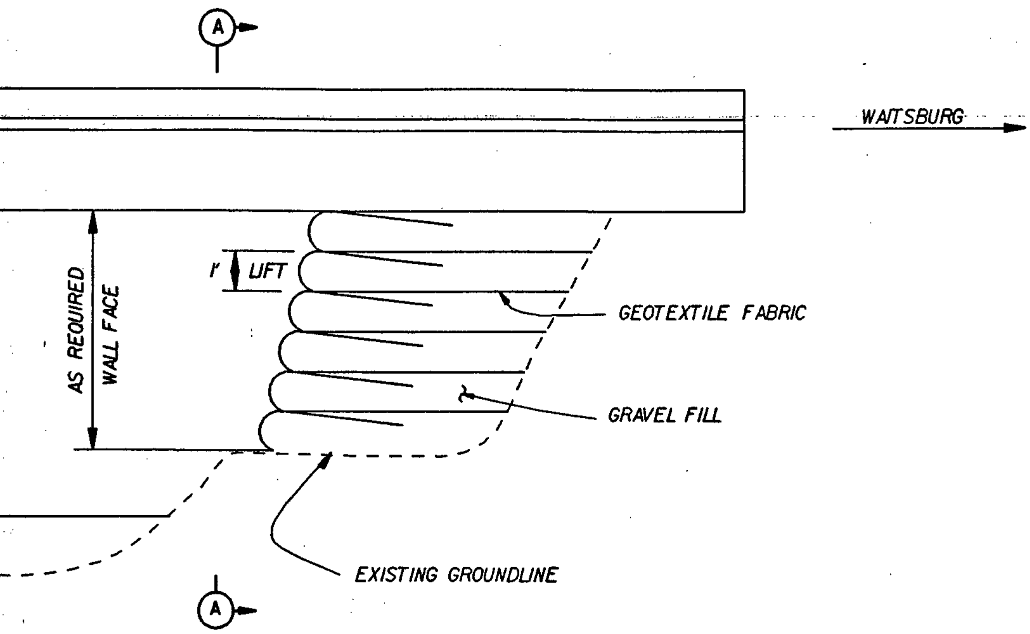
A - TEMPORARY DETOUR BRIDGE

NOT TO SCALE

(2)

SAFETY PAYS

U. S. ARMY



PORARY DETOUR BRIDGE

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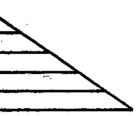

REVISION	DATE	DESCRIPTION	CHKD.	APPR.

U .S . ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED BY
KGO
DRAWN BY
FINK
CHECKED BY
SUPERVISED

WALLA WALLA RIVER BASIN
COPPEI CREEK FLOOD CONTROL STUDY
VICINITY OF WAITSBURG, WASHINGTON

TEMPORARY DETOUR BRIDGE
ELEVATION, SECTION

CHIEF
SUBMITTED
APPROVED: DATE:
CHIEF
RECOMMENDED
CHIEF

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VALUE ENGINEERING PAYS

REFERENCE FILES ATTACHED
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28-MAR-2002 09:46

APPENDIX A

CORRESPONDENCE, MEETING SUMMARY, AND COMMENTS

APPENDIX A

Table of Contents

Correspondence:

Meeting Summary and Public Comments:

147 Main Street
P.O. Box 35
Waitsburg, WA 99361
(509) 337-6371
(509) 337-8089

City of Waitsburg

February 19, 1999

Lieutenant Commander William E. Bulen, Jr.
Corps of Engineers
U.S.A Engineer District, Walla Walla
201 N. Third Avenue
Walla Walla, WA 99362

Dear Lieutenant Commander Bulen:

Leonard Pittman of the Washington State Department of Transportation informed us that the Corps is currently looking at a Backwater Analysis of the Coppei Creek through Waitsburg. As part of the Backwater Analysis, the City requests that the Corps evaluate a possible flood control plan for the Coppei Creek that could be combined with the Washington State Department of Transportation's planned replacement of the Coppei Creek Bridge located on SR12.

We would appreciate any time and consideration you may give this matter.

Respectfully yours,

H.V. Zuger
H.V. Zuger
Mayor

CC: Leonard Pittman, WSDOT

"ONE OF A KIND"

April 2, 2001

LTC. Richard P. Wagenaar
District Engineer
U.S. Army Corps of Engineers
Walla Walla District
201 North Third Avenue
Walla Walla, WA 99362-1876

Dear LTC Wagenaar:

The Waitsburg Coppei Flood Control District (WCFCD) is submitting this letter of intent as notification of our desire to partner with the U.S. Army Corps of Engineers, Walla Walla District, in a study feasibility for potential construction of flood control measures on Coppei Creek, near Waitsburg, Washington. WCFCD requests assistance from the U.S. Army Corps of Engineers, Walla Walla District, under Section 205 of the 1948 Flood Act, as amended.

The proposed site is in Section 14, Township 9 North, Range 37 East, W.M., Walla Walla County, Washington.

The *1997 Walla Walla River Watershed Reconnaissance Report* initially identified this project as one of value to the residents of both the City of Waitsburg and Walla Walla County because of its potential to handle overflow of the right bank in the event of a 100-year flood.

If the outcome of this feasibility study is a recommendation for construction, WCFCD is aware that the project sponsors will be required to:

- Provide without cost to the United States all lands, easements, right-of-ways, and relocations, including suitable borrow and replacement areas (LERRD) as determined by the Federal government to be necessary for the construction of the project. The value of LERRD will be included in the total project costs, as defined in the project cooperation agreement.

- Provide guidance and leadership in preventing unwise future development of the flood plain by use of appropriate flood plain management techniques to reduce flood losses.

- Provide cash contribution of five percent of project cost at the start of construction.

- If the total of the LERRD and 5% cash contributions does not exceed 35% of the project cost, provide a cash contribution to make the total contribution equal to 35%.

- Hold and save the United States free from claims for damages which may result from the construction and subsequent maintenance of the project, except damages to the fault or negligence of the United States or its contractors.

- Prevent future encroachment, which might interfere with proper functioning of the project for flood damage reduction.

- Assume responsibility for all costs in excess of the Federal portions, which has a cost limitation of $5 million; and

- Assure maintenance and repair of the project during the useful life of the work as required to serve the project's intended purpose, with no additional cost to the Federal government.

We appreciate your assistance in this matter and look forward to working with you as partners in flood prevention.

Sincerely,

Dan G. Bickelhaupt

Mr. Dan[redacted] Bickelhaupt
Chairman, WCFCD

Washington State Department of Transportation
Sid Morrison
Secretary of Transportation

South Central Region
2809 Rudkin Road, Union Gap
P.O. Box 12560
Yakima, WA 98909-2560

(509) 575-2510

April 3, 2001

LTC. Richard P. Wagenaar
District Engineer
U.S. Army Corps of Engineers
Walla Walla District
201 North Third Avenue
Walla Walla, WA 99362-1876

Dear LTC Wagenaar:

Washington State Department of Transportation, South Central Region, (WSDOT) is submitting this letter of intent as notification of our desire to partner with the City of Waitsburg, the Coppei Diking District, and the U.S. Army Corps of Engineers, Walla Walla District, in a study of feasibility for potential construction of flood control measures on Coppei Creek, near Waitsburg, Washington. WSDOT requests assistance from the U.S. Army Corps of Engineers, Walla Walla District, under Section 205 of the 1948 Flood Act, as amended.

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>
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- Hold and save the United States free from claims for damages which may result from the construction and subsequent maintenance of the project, except damages to the fault or negligence of the United States or its contractors.

- Prevent future encroachment, which might interfere with proper functioning of the project for flood damage reduction.

- Assume responsibility for all costs in excess of the Federal portions, which has a cost limitation of $5 million; and

- Assure maintenance and repair of the project during the useful life of the work as required to serve the project's intended purpose, with no additional cost to the Federal government.

As you know, the WSDOT is in the process of determining the respective responsibilities of the City of Waitsburg, the Coppei Diking District and the WSDOT in relation to the above outlined federal requirements since the WSDOT is legally limited as to its participation in some of the conditions. Therefore for clarity, it is the WSDOT's understanding that this letter of intent is not binding upon the WSDOT until each partner's responsibility is defined and a Project Cooperation Agreement is signed. We appreciate your assistance in this matter and look forward to working with you as partners in flood prevention.

Sincerely,

Leonard Pittman, P.E.
Regional Administrator

LDP:bjd

cc: Ann Salay, AG
Todd Trepanier

Fink, Steven J NWW

Subject: FW: Funding letter

-----Original Message-----
From: Pittman, Leonard [mailto:PittmaL@WSDOT.WA.GOV]
Sent: Wednesday, April 11, 2001 1:35 PM
To: 'Fink Steve, ACOE'
Cc: Dahl, Bev; Trepanier, Todd
Subject: Funding letter

Dear Steve:

Re: Financial Statement and Plan:

The Washington Department of Transportation (WSDOT) is interested in partnering with the Army Corps of Engineers (COE), the City of Waitsburg, and Waitsburg's Diking District to replace the SR 12 Coppei bridge, and to both construct and maintain upstream and downstream levee's.

The WSDOT commitment to this project is in terms of the existing SR 12 bridge replacement, and the subsequent roadwork necessary, including a detour. WSDOT will also do the operations and maintenance (O&M) of the roadway and bridge. It is our expectation that the COE will design and construct the levee's, and finally the Waitsburg Diking District will do the long term O&M of the levee. The city of Waitsburg will acquire the needed easements for the Levee with WSDOT's help.

It is anticipated and expected that WSDOT's contribution, along with Waitsburg's easements for the Levee's will meet the 35% contribution needed from the proponents, and that we can work out the details of making a 5% cash transfer.

WSDOT's proposed funding sources are as follows.

Already obtained: Preliminary Engineer dollars ($189,000), and Right of Way dollars for the detour ($21,840). The PE dollars will come from our P3 allocation, and the right of way dollars from our P2 allocation. (P3 is Major Drainage, and P2 is Structure Preservation).

The actual construction dollars must come from our 03-05 biennium dollars, also in P2. We currently have programmed $990,396 for construction in 03-05. However, since we only program one biennium at a time, we will not know if an emergent need develops in the bridge preservation program until later in 02. Baring none, this program would be funded on schedule for the 03-05 biennium.

Our funds are a mixture of Federal gas tax dollars, and State gas tax dollars. Both funding sources set up in law and statutes.

We are looking forward to partnering with the COE and others on this needed project. Please let me know if you need any additional information.
Thanks.

Sincerely,

LP

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Columbia Fish and Wildlife Office
11103 East Montgomery Drive
Spokane, Washington 99206

May 2, 2001

Mr. Peter F. Poolman
Chief, Environmental Planning Section
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, WA 99362-1876

Subject: COE, Seattle District, FWCA, Coppei Creek, Walla Walla County, Washington
(File # 351.0000/OALS# 01-0388)

Dear Mr. Poolman:

This is in response to your March 9, 2001, Coordination Act Report (CAR) request, and the attached draft Biological Assessment for the Corps of Engineers proposed replacement of the U.S. Highway 12 bridge, and the construction of a setback levee and flood retaining wall on Coppei Creek. The project is located within Sections 14 and 15, Township 9 North, Range 37 East, W.M., in Walla Walla County, Washington. This response is made in accordance with the Fish and Wildlife Coordination Act, and section 7 of the Endangered Species Act (ESA) of 1973, as amended.

Based on existing staff workload, we regret that we are unable to participate in the preparation of a CAR for the proposed action. Therefore, we are not preparing a cost estimate and schedule for the preparation of a CAR. However, we look forward to working with you during your upcoming section 7 consultation (ESA) on this project.

Thank you for the opportunity to participate in the review of the proposed action. If you have any questions, please contact Rick Donaldson of my staff at 509-893-8009, or e-mail rick_donaldson@r1.fws.gov.

Sincerely,

Robert J. Hallock

Acting Supervisor

May 30, 2001

COPY

Lt. Col. Richard P. Wagenaar
U.S. Army Corps of Engineers
Walla Walla District
201 N. 3rd Avenue
Walla Walla, WA 99362

RE: Coppei Creek Project – Vicinity of Waitsburg
Financial Statement and Plan

Dear Lt. Col. Wagenaar:

The Waitsburg Coppei Flood Control District is a municipal corporation of the State of Washington. It is interested in participating with the Corp of Engineers (COE), the City of Waitsburg, Washington, and the Washington Department of Transportation (WSDOT) to replace the SR-12 Coppei Creek bridge and to construct and maintain upstream and downstream levies along Coppei Creek.

This letter is intended to express the District's commitment to the project. The District recognizes that the estimated budget for the project will require it to contribute $139,900 cash and $143,600 in estimated real estate costs. In addition, there is a $5,000 annual budget for O & M of the levies and floodwalls. This will be the responsibility of the Flood Control District. Other costs will be funded by the Corp of Engineers and by the WSDOT.

The District plans to meet these obligations through a combination of financing. First, the Flood Control District intends to enter into an interlocal agreement with the City. The purpose of an interlocal agreement will be to recognize that a portion of the flood control improvements will be located within the City limits. The City will cooperatively share in the costs of these

improvements, the administration, as well as the continuing O & M of the levies and floodwalls.

Once the inter local agreement is in place, the Flood Control District and the City will cooperatively work to meet the obligations of the Flood Control District for this project. The sources of financing will include some monies from the general funds of the City, to be provided on an annual basis and funds from the assessments imposed annually on property owners by the District. These amounts will be more than adequate to meet the annual O & M costs.

To meet the requirement for $139,900 cash, the District intends to sub-contract with the State. One element of that sub-contract will establish an escrow account, to be funded with $139,900 from the State and designated to satisfy the cash requirement of the District. As to the real estate requirements for the projects, the City and the Flood Control District cooperatively, under the interlocal agreement, intend to apply for several grants to complete the additional funding. These grants may be from the State of Washington, FEMA, and other sources. In addition to that, the City and the Flood Control District will seek a portion of the real estate obligation through private donations from landowners. We estimate that 80% of the real estate can be acquired by donation. The City and District together will provide the remainder by grants and from general fund monies.

By a combination of these means, the Flood Control District, in cooperation with the City, intend to meet for financial obligations of this project. If you need any additional information, please feel free to contact me.

Very truly yours,

Waitsburg Coppei Flood Control District

Dan Bickelhaupt, Chairman

WEB:dll
Letter – corpof engineers, 010525

Walla Walla District Corps of Engineers
Attn: Steve Fink
201 North Third Avenue
Walla Walla, WA 99362

Subject: Coppei Creek Flood Control Project

Dear Steve:

The Waitsburg Coppei Flood Control District would like to waive the right to a Flood Damage Reduction Risk Based Analysis for the subject project. We do not consider a risk analysis for this project to be cost effective and prefer not to cost share such an effort. We understand that the proposed levee and floodwall provides 3 feet of freeboard above the 1 percent flood. We also understand that the risk analysis eliminates the idea of freeboard and instead uses a statistical analysis for establishing the appropriate levee height based on the risk of overtopping. Having been made aware of these facts, WCFCD hereby waives the Flood Damage Reduction Risk Based Analysis.

Sincerely,

Dan D. Bickelhaupt

Mr. Dan Bickelhaupt
Chairman, Coppei Touchet Flood Control District

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Columbia River Basin Field Office
11103 E. Montgomery Drive
Spokane, WA 99206

August 8, 2001

Peter F. Poolman, Chief
Environmental Compliance Section
Walla Walla District
U.S. Army Corps of Engineers
201 N Third Ave
Walla Walla, WA 99362-1876

Subject: Coppei Creek Setback Levee and Bridge Replacement Project; FWS Reference 1-9-01-I-0486, Cross Reference 1-9-01-SP-374 (351.0000)

Dear Mr. Poolman:

This responds to your request of May 25, 2001, for informal consultation on the Coppei Creek levee and bridge replacement project, Waitsburg, Walla Walla County, Washington. Your request with a biological assessment (BA) was received in this office on May 29, 2001.

We understand that the Corps of Engineers is planning to reduce the potential for flood in Waitsburg by building an earthen levee between the town and the creek, with a concrete retaining wall in the vicinity of the SR 12 bridge, where houses are close to the creek. The SR 12 bridge will be replaced and expanded. The retaining wall will be set back approximately 25 feet from the ordinary high water line. The earthen part of the levee will tie into the retaining wall, and will be set back 65 to 475 feet from the ordinary high water line. The existing agricultural land uses and grazing will continue in the floodplain, and existing vegetation will be left intact.

The U.S. Fish and Wildlife Service concurs that the proposed project as described in the BA is not likely to adversely affect the bull trout and Ute ladies'-tresses.

This concludes informal consultation pursuant to section 7(a)(2) of the Endangered Species Act of 1973, as amended (Act). This project should be re-analyzed if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this consultation; and/or, if a new species is listed or critical habitat is designated that may be affected by this project.

If you have further questions about this letter or your responsibilities under the Act, please contact Linda Hallock of this office at 509-893-8012.

Sincerely,

Susan B. Martin

Supervisor

c: WDFW, Region 1

STATE OF WASHINGTON

OFFICE OF COMMUNITY DEVELOPMENT

Office of Archaeology and Historic Preservation

1063 S. Capitol Way, Suite 106 - Olympia, Washington 98501

(Mailing Address) PO Box 48343 • Olympia, Washington 98504-8343

(360) 586-3065 Fax Number (360) 586-3067

June 6, 2002

Mr. Peter F. Poolman
U.S. Army Corps of Engineers
Walla Walla District
201 North Third Avenue
Walla Walla, Washington 99362-1876

In future correspondence, please refer to:
Log: 060602-22-COE-WW
Re: Coppei Creek Flood Control Project, Waitsburg

Dear Mr. Poolman:

Thank you for contacting the Washington State Office of Archaeology and Historic Preservation (OAHP) regarding the above referenced action. This consultation is in adherence to the National Historic Preservation Act of 1966 (as amended) and implementing regulations 36 CFR Part 800.4. From your communication, I understand that the U.S. Army Corps of Engineers (COE) proposes to construct flood control structures along Coppei Creek in Waitsburg including two set back levees, floodwalls, and replacement of the U.S. 12 bridge over Coppei Creek.

In response and on behalf of the State Historic Preservation Officer (SHPO) I have reviewed the documentation submitted in support of your communication. As a result of my review, I concur with your determination that implementation of this action will have no effect on historic properties listed in, or eligible for listing in, the National Register of Historic Places. This determination concerns historic properties identified within the Area of Potential Effect including the Coppei Bridge, historic artifact scatter, flood control ditch, railroad grade, driveway pillars, and the footbridge foundation.

In regard to the U.S. 12 bridge over Coppei Creek and as the report makes clear, this bridge was inventoried in 1980 as a part of a statewide effort to identify bridges eligible for listing in the National Register. At that time, the Coppei Creek Bridge was determined to be a Category II Bridge, in essence having historic interest in view of its age and character but not attaining the level of significance meriting National Register recognition. Subsequently, a programmatic agreement between the Federal Highway Administration (FHWA) and the SHPO agreed that Category II Bridges were to be considered not eligible for future planning purposes but were to be documented before replacement. Therefore, documentation of this bridge before replacement is appropriate mitigation. I would comment that the Coppei Creek Bridge has character and structural integrity that contribute to the sense of place that flavors the historic community of Waitsburg. The graceful luten arch, the classical baluster, and the fluted concrete light standards provide a distinctive "gateway" to the community and its many historic buildings. Therefore, I recommend that the replacement bridge be designed to continue this same level of detail and character. This effort should include balusters and light standards that do not necessarily replicate but hearken to the design of the existing bridge. It may be worthwhile to consult with members of the public to assess their interest in the design and recommendations they may have for the replacement bridge.

In regard to the historic driveway pillars, I also recommend that these objects remain in place during construction. If that is not possible, the pillars should be appropriately stored during construction and re-installed at the same location once construction is completed.

Again, thank you for the opportunity to review and comment on this action.. Should you have any questions, please feel free to contact me at 360-586-3073 or gregg@cted.wa.gov.

Sincerely,

Greg Griffith

Gregory Griffith
Deputy State Historic Preservation Officer

GAG

Cc: Craig Holstine, WSDOT

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

July 18, 2002

Peter F. Poolman
Department of the Army
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, Washington 99362-1876

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Coppei Creek Setback Levee and Bridge Replacement Project, Walla Walla County, Washington (NMFS No. WSB-01-242).

Dear Mr. Poolman:

The attached document transmits the National Marine Fisheries Service (NOAA (National Oceanic and Atmospheric Administration) Fisheries) Biological Opinion (BO) on the proposed Coppei Creek Setback Levee and Bridge Replacement Project in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531). The US Army Corps of Engineers (COE) has determined that the proposed actions are likely to adversely affect the Middle Columbia River (MCR) steelhead (*Oncorhynchus mykiss*) Evolutionarily Significant Unit (ESU). Formal consultation was initiated for this project on May 29, 2001.

This BO reflects formal consultation and an analysis of effects covering the MCR steelhead in Coppei Creek near Waitsburg, Washington. The BO is based on information provided in the biological assessment sent to NOAA Fisheries by the COE on May 25, 2001, subsequent information transmitted by telephone conversations and electronic mail, and a site visit to the project area on November 7, 2001. A complete administrative record of this consultation is on file at the Washington State Habitat Branch Office.

NOAA Fisheries concludes that the implementation of the proposed project is not likely to jeopardize the continued existence of MCR steelhead. Please note that the incidental take statement, which includes reasonable and prudent measures and terms and conditions, was designed to minimize take. If you have any questions, please contact Justin Yeager of the Washington State Habitat Branch Office at (509) 925-2618.

Sincerely,

Michael R Crouse

D. Robert Lohn
Regional Administrator

Endangered Species Act - Section 7 Consultation

Biological Opinion

And

Magnuson-Stevens Fishery Conservation and Management Act

Coppei Creek Setback Levee and Bridge Replacement Project
Walla Walla County, Washington
WSB-01-242

Agency: US Army Corps of Engineers

Consultation Conducted By: NOAA Fisheries,
Northwest Region

Issued by: Michael R Crouse
D. Robert Lohn
Regional Administrator

Date: 7/18/02

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1.0 INTRODUCTION

1.1 Background and Consultation History

On May 29, 2001, National Marine Fisheries Service (NOAA (National Oceanic and Atmospherice Administration) Fisheries) received a Biological Assessment (BA) and a request for Endangered Species Act (ESA) section 7 formal consultation from the United States Army Corps of Engineers (COE) for the Coppei Creek Setback Levee and Bridge Replacement Project. The BA described a proposal to replace the existing bridge with a new, higher capacity bridge that is designed to pass the 100-year flood event. The BA also described the construction of a setback levee and retaining wall that is designed to protect the city of Waitsburg, Washington from flood damage.

This Biological Opinion (BO) is based on the information presented in the BA, phone conversations, electronic mail correspondence, and a site visit on November 7, 2001.

The proposed project area occurs within the Middle Columbia River (MCR) Evolutionarily Significant Unit (ESU). Coppei Creek drains into the Touchet River in the city of Waitsburg. The Touchet River is a tributary to the Walla Walla River. The COE has determined that the project "may affect, and is likely to adversely affect" MCR steelhead (*Oncorhynchus mykiss*). The objective of this BO is to determine whether the proposed project is likely to jeopardize the continued existence of MCR steelhead. The standards for determining jeopardy are described in section 7(a)(2) of the ESA and further defined in 50 C.F.R. Part 402.14. This document also presents NOAA Fisheries' consultation covering Essential Fish Habitat (EFH) under the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

1.2 Description of the Proposed Action

The COE proposes to permit a series of activities in and around Coppei Creek to reduce the risk of flood damage to the city of Waitsburg. The proposed project includes the construction of a setback levee and a flood retaining wall on the right bank of Coppei Creek. The project also includes the replacement of the existing State Route (SR) 12 bridge over Coppei Creek in order to provide adequate capacity to pass the 100-year flood event. The new bridge would be elevated about one meter above the existing bridge deck level. The proposed project is scheduled to begin in early summer of 2003. All in-water work will be completed between July 15, 2003 and September 30, 2003.

Earthen Sections of the Levee: The earthen levee would be set back 20 to 120 meters from Coppei Creek. It would be three meters wide at the top with a side slope of one unit vertical to three units horizontal and a layer of riprap protection at the toe on the creek side. The required levee height is estimated to vary from about one to two meters, making the base of the levee about 14 meters at its widest point. The levee would be constructed with 23,000 cubic yards of material including 510 cubic yards of riprap. The levee would be covered with geotextile fabric

and topsoil, then fertilized and planted with grass to match the surrounding vegetation. Trees larger than four inches in diameter would not be permitted to establish on the levee for structural integrity reasons. Current land use practices of cultivated agriculture and grazing would continue between the levee and the riparian zone.

Retaining Wall Sections of the Levee: Two concrete retaining walls are proposed for the right bank immediately upstream and downstream of SR 12. The first retaining wall would tie into the setback levee about 125 meters upstream of SR 12. The second retaining wall would tie into high ground about 125 meters downstream of SR 12. Both walls would be at least 7.6 meters from the ordinary high water mark (OHWM) and 1.2 to 2.3 meters tall. Prior to wall construction, the berm immediately upstream of SR 12 bridge would be leveled using heavy equipment. The berm has been pushed up around several large trees, which would be left in place and the riprap pulled out from around them. Any riprap below the OHWM would be left in place to minimize stream disturbance.

Temporary Bridge: A temporary detour road and bridge would be placed immediately upstream of the existing bridge to accommodate traffic during removal of the existing bridge and construction of the new bridge. No in-water work would be required for the construction or removal of the temporary bridge as the footings for the temporary bridge would be placed on the existing ground surface.

Existing Bridge Removal: Removal of the existing bridge would require the removal of its concrete footing material from below the OHWM and would take approximately two weeks. Stream flow would need to be rerouted through the construction area in order to separate excavation from flowing water. This could be accomplished in two ways. First, the stream could be routed through a culvert for the duration of construction. Alternatively, geotextile fabric could be secured to the ground below and around the bridge to contain any debris. If this method were employed, the fabric would be placed in the streambed and the stream would flow over the top of the fabric except during excavation or material placement in the streambed. Rerouting the stream with sandbags would be required during these activities to isolate construction activities from streamflow.

New Bridge Construction: The new bridge would be 50 feet long and 48 feet wide. It would be a single arch spanning the entire creek. The new bridge abutments would be constructed of reinforced concrete. The new footings would be below the OHWM, 10 feet landward of the current footings. The new bridge would be designed to accommodate connection with the new retaining walls on the right streambank.

Riparian Vegetation Removal: The riparian vegetation within the footprint of the proposed retaining wall would be removed. This amounts to about 82.5 square meters, most of which is non-native and/or ornamental shrubbery and grass. Existing vegetation between the creek and the wall would be left intact. All vegetation within the footprint of the temporary bridge would be removed.

Vegetation Planting: The earthen sections of the levee would be fertilized and planted with grass to match the existing vegetation. Trees larger than four inches in diameter would not be allowed to establish due to structural integrity reasons. After construction of the new bridge, the disturbed ground (including the footprint of the temporary bridge) would be revegetated with native trees and grasses.

Riprap Placement: Five-hundred and ten cubic feet of riprap would be used in the construction of the setback levees. Riprap placement would also be required at the toe of the retaining walls and at the new bridge abutments to prevent erosional undermining in the event of a flood.

Equipment Staging: Equipment fueling and maintenance would occur in designated areas at least 50 meters from the stream channel. At least two staging areas will be used for the levee construction; one near the upstream end and one near the downstream end. All equipment maintenance and refueling would take place in the staging areas. All disturbed surfaces will be reseeded upon project completion.

Best Management Practices (BMPs) related to the project included in the BA.

General BMPs

- The activities must comply with all water quality protection related conditions contained in the Washington State Department of Fish and Wildlife (WDFW) Hydraulic Approval (HPA) including time limitations.

- When removing and repairing existing structures, all demolition and construction material shall be removed from the water and disposed of properly in an upland site. Requirements contained in the HPA for dealing with large concrete pieces will be followed. If the method of taking the bridge apart is to saw-cut portions off, tarping is required to control and contain all saw-cut water. The saw-cut water shall be disposed of on land with no possibility of entry to surface waters. Under no circumstances shall free fall dumping of fill material occur in or next to any water body unless control structures are in place to prevent sediment from directly entering the waterbody.

- The natural flow of any affected water body shall be diverted around the construction site unless written approval to work in the flowing water is obtained from WDFW. Diversion may entail tight lining, coffer dams, or equivalent structures. The stream diversion system shall be designed and operated so as to not cause erosion or scour in the stream channel or banks of the water body.

- Material used to construct road approaches to access the project site shall be of clean composition and placed in a manner to prevent erosion and siltation that might result from high water and/or heavy rains. The approach areas shall be stabilized and planted to meet WDFW and local requirements upon completion of the project.

- Riprap shall be clean and durable, free from dirt, sand, clay, and rock fines.

- Unless authorized by WDFW, heavy equipment shall not enter the water and will be operated as far from the waters edge as possible. Impacts to bank and shoreline vegetation shall be limited to the maximum extent possible. Areas damaged by equipment or by placing of approach materials shall be stabilized or replanted where destroyed or damaged by equipment.

- Bank vegetation shall be protected during removal and storage of debris material. If vegetation is destroyed, the bank shall be immediately replanted upon completion of debris removal.

Water Quality BMPs

- The project will be designed to avoid or minimize impacts to waters of the State. There shall be no visible sheen from petroleum products in the receiving water as a result of project activities. Work in or near the waterway shall be done so as to minimize turbidity, erosion, other water quality impacts, and stream bed deformation. All construction debris and excess sediment shall be properly managed and disposed of so as to prevent it from entering the waterway or cause water quality degradation of State waters.

- All work in or near the water and water discharged from the site shall meet the State's Water Quality Standards, WAC 173-201A.

Concrete Handling BMPs

- All concrete shall be poured in the dry, or within confined waters not being dewatered to surface waters, and shall be allowed to cure for a minimum of seven days before contact with water. The waters of the State shall not come in contact with the concrete structure site while the concrete is curing. Any dewatering required from a contained area with curing concrete shall be discharged to land with no possible entry to surface waters. A separate area shall be set aside, that does not have any possibility of draining to surface water, for the wash out of concrete delivery trucks, pumping equipment, and tools.

Erosion Control BMPs

- All areas disturbed or newly created by the projects construction shall be stabilized as soon as possible to prevent erosion and shall comply with the Temporary Erosion and Sediment Control Plan. Periodic inspection and maintenance of all erosion control structures shall be conducted no less than every seven days. Additional inspections shall be conducted prior to and after expected rainfall events to ensure erosion control measures are in working condition. Any damaged structure will be immediately repaired. If it is determined that additional measures are needed to control storm water and erosion they shall be implemented immediately.

Hazardous Spill Prevention and Control BMPs

- No petroleum products, fresh cement or concrete, chemicals, or other toxic or deleterious materials shall be allowed to enter waters of the State. The discharge of oil, fuel, or chemicals to waters of the State or onto land with potential for entry into State waters, is prohibited. No cleaning solvents or chemicals utilized for tool or equipment cleaning may be discharged to the ground or to waters of the State. All oil, fuel, or chemical storage tanks or containers shall be diked and located on impervious surfaces so as to prevent spills from escaping to surface waters or ground waters of the State. Waste liquids shall be stored under cover. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc. shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into State waters.

1.3 Description of the Action Area

The Action Area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 C.F.R. 402.02). The action area includes Coppei Creek and the surrounding riparian vegetation starting at the footprint of the farthest upstream setback levee, downstream through the footprint of the retaining walls, the bridge over SR 12, the temporary bridge, and the downstream setback levee. The precise downstream limit of the action area cannot be easily determined because the extent of the effects of the proposed action would vary according to flow stage.

2.0 ENDANGERED SPECIES ACT

2.1 Biological Opinion

2.1.1 Status of Species

2.1.1.1 MCR Steelhead

MCR steelhead were listed as a threatened species on March 25, 1999 (63 Fed. Reg. 14517). The MCR steelhead ESU includes streams and tributaries to the Columbia River above the Wind River in Washington and the Hood River in Oregon upstream to and including the Yakima River. It encompasses all naturally spawned populations of steelhead and their progeny. Excluded are the steelhead of the Snake River Basin.

All steelhead in the Columbia River Basin upstream of the Dalles Dam are summer-run (stream maturing), inland steelhead (Chapman et al. 1994). The sexually immature summer-run steelhead enter fresh water between May and October. Their pre-spawning migration can last up to one year. Steelhead adults in Washington typically spawn between February and June (Busby et al. 1996). Depending on water temperature, steelhead eggs may incubate in redds for 1.5 to 4

months before hatching as alevins (63 Fed. Reg. 13347; March 25, 1999). Most MCR steelhead smolt at two years and spend one to two years in saltwater before re-entering freshwater.

Steelhead require different habitat types during their life history. Spawning generally occurs in the gravel substrates of smaller streams and the side channels of larger rivers (Busby et al. 1996). Rearing juvenile steelhead utilize a variety of instream cover, including riffles, mid-channel pools, pocket water, overhanging vegetation and large woody debris (LWD). Juveniles will generally occupy riffle areas during the summer, and pools in spring, fall, and winter (Wydoski and Whitney 1979). Further life history information can be found in the Notices of Proposed Rulemaking (61 Fed. Reg. 41541; August 9, 1996 and 63 Fed. Reg. 13347; March 25, 1999).

Estimates of historical (pre-1960's) abundance specific to this ESU are available for the Yakima River only, with an estimated run size of 100,000 (WDF et al. 1993). Assuming comparable run sizes for drainage area, the total historical run size for this ESU may have exceeded 300,000 (Busby et al. 1996). Total run sizes for the major stocks in the Columbia River above Bonneville Dam, including the Upper Columbia River, Lower Columbia River, and Snake River ESUs, were estimated as 4,000 winter steelhead and 210,000 summer steelhead in the early 1980's by Light (1987). Light estimated that 80 percent of this run was of hatchery origin.

High summer and low winter temperatures are limiting factors in many streams in this ESU (Bottom et al. 1985). There is little or no late summer flow in sections of the Umatilla and Walla Walla Rivers. Riparian vegetation is heavily impacted by overgrazing, other agricultural practices, timber harvest, road building, and channelization. Riparian restoration is needed for between 37 percent and 84 percent of river banks within this ESU (Busby et al. 1996). Instream habitat is also degraded by these factors, as well as by past gold dredging and severe sedimentation due to poor land management practices (Kuttel 2001).

Busby et al. (1996) computed population trends for 14 stocks in this ESU. Eight of these trends were significantly different than zero, with seven negative and one positive. However, estimates of total run size (based on dam counts) for this ESU show an overall increase in steelhead abundance, with a relatively stable naturally produced component. The John Day River represents the largest native, natural spawning stock in the region. Past and present hatchery practices pose a major threat to genetic integrity of MCR steelhead.

For the MCR steelhead ESU as a whole, NOAA Fisheries estimates that the median population growth rate (lambda) over the base period ranges from 0.88 to 0.75, decreasing as the effectiveness of hatchery fish spawning in the wild increases compared to that of fish of wild origin (Tables B-2a and B-2b in McClure et al. 2000). NOAA Fisheries has also estimated the risk of absolute extinction for four of the spawning aggregations, using the same range of assumptions about the relative effectiveness of hatchery fish. At the low end, assuming that hatchery fish spawning in the wild have not reproduced (i.e., hatchery effectiveness = 0), the risk of absolute extinction within 100 years ranges from zero for the Yakima River summer run to 100 percent for the Umatilla River and Deschutes River summer runs (Table B-5 in McClure et

al. 2000). Assuming that the hatchery fish spawning in the wild have been as productive as wild-origin fish (hatchery effectiveness =100 percent), the risk of absolute extinction within 100 years ranges from zero for the Yakima River summer run to 100 percent for the Deschutes River summer run (Table B-6 in McClure et al. 2000).

2.1.2 Evaluating the Proposed Actions

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by 50 C.F.R. 402, et. seq. NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of (1) defining the biological requirements of the listed species, and (2) evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries considers estimated level of mortality attributed to: (1) collective effects of the proposed or continuing action, (2) the environmental baseline, and (3) any cumulative effects. As a surrogate for estimating fish mortality for this BO, NOAA Fisheries has considered the extent of project effects on habitat listed salmon need to express certain essential behavior patterns. This evaluation must take into account measures for survival and recovery specific to the listed salmon's life stages that occur beyond the action area. NOAA Fisheries must identify any reasonable and prudent alternatives available for the action if it is determined that the action will jeopardize the listed species.

2.1.2.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmon is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species; taking into account population size, trends, distribution, and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its original decision to list the species for protection under the ESA. Additionally, the assessment will consider any new information or data that are relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to naturally reproducing population levels at which time protection under the ESA would be unnecessary. Species or ESUs not requiring ESA protection have the following attributes: population sizes large enough to maintain genetic diversity and heterogeneity, the ability to adapt to and survive environmental variation, and are self-sustaining in the natural environment.

The biological requirements for MCR steelhead include food (energy) source, flow regime, water quality, habitat structure, passage conditions (migratory access to and from potential spawning and rearing areas), and biotic interactions (Spence et al. 1996).

NOAA Fisheries has related the biological requirements for listed salmonids to a number of habitat attributes, or pathways, in the Matrix of Pathways and Indicators (MPI). These pathways (Water Quality, Habitat Access, Habitat Elements, Channel Condition and Dynamics, Flow/Hydrology, Watershed Conditions, Disturbance History, and Riparian Reserves) indirectly measure the baseline biological health of listed salmon populations through the health of their habitat. Specifically, each pathway is made up of a series of individual indicators (e.g. indicators for Water Quality include Temperature, Sediment, and Chemical Contamination) that are measured or described directly (see NMFS 1996). Based on measurement or description, each indicator is classified within a category of the properly functioning condition (PFC) framework: (1) properly functioning, (2) at risk, or (3) not properly functioning. PFC condition is defined as "the sustained presence of natural habitat forming processes in a watershed that are necessary for the long-term survival of the species through the full range of environmental variation."

Based on the best available information, NOAA Fisheries concludes that not all of the biological requirements of MCR steelhead are being met under the environmental baseline in this watershed including water quality and quantity, shoreline stability, and riparian vegetation. The status of the species is such that there must be substantial improvements in the environmental conditions to meet the requirements for long term survival and recovery of the species. Further degradation of these conditions could substantially reduce the likelihood of survival and recovery of the species due to the amount of risk they already face under the current environmental baseline.

2.1.2.2 Environmental Baseline

The environmental baseline represents the current basal set of conditions to which the effects of the proposed action would be added. The term "environmental baseline" means "the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process" (50 C.F.R. 402.02).

Coppei Creek originates on the western slope of the Blue Mountains in southeast Washington, at an elevation of 1220 meters. The proposed project location is at about 400 meters in elevation. The North and South forks of Coppei Creek flow for a combined total of 29 kilometers before reaching the Touchet River near the city of Waitsburg.

The climate of the Coppei Creek area is predominantly dry and is characterized by wide seasonal variations in temperature, as well as geographical differences in precipitation. The average afternoon temperature in the summer is near 32° C, with nighttime temperatures between 15° and 20° C. In winter, average afternoon temperatures are around 1.5° C. Extremes of -27° to

45° have been recorded in the area. Annual precipitations in the area ranges from about 47 centimeters near Dayton to more than 100 centimeters in the Blue Mountains.

Flows in Coppei Creek are generally low in July through October and moderate to high in the late winter and early spring months. Intensive rainstorms, excessive snowmelt, or rain-on-snow events can cause high flows. Mendel et al. (2000) monitored stream flow conditions during the summer of 1999. Flows dropped below three cubic feet per second from mid-June through September.

The environmental baseline in the proposed project area has clearly been compromised due to channel straightening, urbanization, upstream agricultural practices, and upstream forest practices. Although the COE concluded that Coppei Creek is suitable for rainbow/steelhead trout, most environmental baseline indicators are either functioning at risk or not properly functioning. Of particular concern is the exceedance of maximum water temperature tolerances for steelhead. Portions of the action area have been identified on the State 303(d) list (Clean Water Act) for degraded temperature and fecal coliform parameters (WSDOE 1998).

2.1.3 Effect of the Proposed Action

The proposed construction of setback levees and retaining walls, bridge replacement, temporary bridge construction and removal, and all related construction activities are likely to adversely affect MCR steelhead. NOAA Fisheries' ESA implementing regulations define "effects of the action" as "the direct and indirect effects of an action on the species together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline" (50 C.F.R. 402.02). "Indirect effects" are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

2.1.3.1 Direct Effects

Direct effects are the immediate effects of the project on the species or its habitat. Direct effects result from the agency action and include the effects of interrelated and interdependent actions. Future Federal actions that are not a direct effect of the action under consideration (and not included in the environmental baseline or treated as indirect effects) are not evaluated (USFWS and NMFS 1998).

2.1.3.1.1 Turbidity

Removal of the existing bridge footings, installation of new footings, and other activities associated with this project would mobilize sediments and temporarily increase downstream turbidity levels. In the immediate vicinity of the construction activities (several hundred feet), the level of turbidity would likely exceed ambient levels by a substantial margin and potentially affect MCR steelhead.

For salmonids, turbidity has been linked to a number of behavioral and physiological responses (e.g., gill flaring, coughing, avoidance, increase in blood sugar levels) which indicate some level of stress (Bisson and Bilby 1982, Sigler et al. 1984, Berg and Northcote 1985, Servizi and Martens 1987). The magnitude of the stress responses is generally higher when turbidity is increased and particle size is decreased (Bisson and Bilby 1982, Servizi and Martens 1987, Gregory and Northcote 1993). Although turbidity may cause stress, Gregory and Northcote (1993) have shown that moderate levels of turbidity accelerate foraging rates among juvenile chinook salmon, likely because of reduced vulnerability to predators due to camouflaging.

When the particles causing turbidity settle out of the water column, they contribute to sediment on the riverbed (sedimentation). When sedimentation occurs, salmonids may be negatively impacted in the following ways: (1) salmonid eggs may be buried and suffocated, (2) prey habitat may be displaced, and (3) future spawning habitat may be displaced (Spence et al. 1996).

The proposed bridge replacement project would cause elevated turbidity levels during the instream construction period and for several days afterwards. However, the effects of this turbidity on MCR steelhead would be minimized by isolating the work area from the stream as described in section 1.2 above. Additionally, the BMPs in section 1.2 and the Terms and Conditions in section 2.2.3 of this BO should minimize the deleterious effects of sedimentation and turbidity. It is also expected that MCR steelhead present during the initial phases of construction would temporarily move to refuges where turbidity can be avoided, thus preventing injury or death. Additionally, the project work window will capitalize on a time of year when neither spawning fish nor redds are present.

NOAA Fisheries expects that turbidity and sedimentation caused by this action would be short lived, returning to baseline levels soon after construction is over. Furthermore, NOAA Fisheries expects that long term impacts would not occur. Other than the short term impacts mentioned above, this project would not change or add to existing baseline turbidity or sedimentation levels within Coppei Creek.

2.1.3.1.2 Streambed and Bank Disturbance

The replacement of the SR 12 bridge over Coppei Creek would disturb the existing substrate present in the river and require a small amount of bank disturbance. The primary mechanism of disturbance would be the removal of the existing concrete footings from below the OHWM. The direct effect to MCR steelhead is expected to be minor. Because of the project work window, juvenile and young-of-the year MCR steelhead present in the action area should be capable of evacuating the action area while any residual effects are manifested.

2.1.3.2 Indirect Effects

Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects may occur outside of the area directly affected by the

action. Indirect effects may include other Federal actions that have not undergone section 7 consultation but will result from the action under consideration. These actions must be reasonably certain to occur, or they are a logical extension of the proposed action.

2.1.3.2.1 Floodplain Alteration

The proposed retaining walls and setback levees proposed for this project are intended to protect the City of Waitsburg from flood events. As such, the proposed project would probably decrease the floodplain capacity on the right bank of Coppei Creek. However, the left side of the floodplain in the action area is unconfined and should continue to serve as a hydraulically functional floodplain as will the area between the channel and the setback levee on the right side of the Coppei Creek. Additionally, the current land use of the right side of the floodplain (beyond the proposed retaining walls) is residential housing, limiting the creeks natural floodplain. Therefore, the amount of functional floodplain lost as a result of this project is discountable.

2.1.3.2.2 Riparian and Fisheries Habitat

The bridge replacement and retaining wall call for removal of primarily non-native and/or ornamental vegetation. This vegetation presently provides a lower level of riparian habitat functions such as shading and organic matter inputs to the stream. Therefore, the loss of riparian function in the action area should be minimal. Furthermore, few large trees will need to be removed for either the bridge replacement or the retaining wall construction. In addition, the proposed action calls for the affected areas to be seeded with native plant stock and riparian plantings, which should improve riparian function over time. The effects of these activities on MCR steelhead and aquatic habitat indicators will be minimized by these measures.

2.1.3.3 Population Level Effects

Construction activities will result in short term effects on listed salmonids. Conservation measures and BMP's are expected to reduce the potential for harm to listed fish that would result from increased turbidity, streambed and bank disturbance, and riparian habitat removal. The action will adversely affect listed salmonids in the Action Area, but effects are not likely to adversely influence existing population trends or risks.

2.1.4 Cumulative Effects

Cumulative effects are defined as "those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation" (50 C.F.R. 402.2). Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Land uses in the Touchet River basin are mostly agricultural. Intensive agriculture with its associated adverse impacts on salmonid habitat will continue. Cumulative effects from upland land use on conditions for MCR steelhead in Coppei Creek will continue to result directly from the manner in which agricultural practices are carried out in the basin. Therefore, cumulative effects on MCR steelhead would be expected to perpetuate existing trends.

2.1.5 Conclusion

NOAA Fisheries has reviewed the direct, indirect, and cumulative effects of the proposed action on MCR steelhead and its habitat. NOAA Fisheries evaluated these effects in the light of existing conditions in the action area and the measures included in the action to minimize the risk of effects. The proposed action is likely to cause short-term adverse effects on MCR steelhead by temporarily modifying habitat during in-water work and through riparian vegetation removal. These effects are reasonably certain to result in incidental take, but the extent of harm is likely to be minimized by specific measures included in the action. As a result, the effects of the action are unlikely to adversely influence the existing population trends or risks for MCR steelhead. Consequently, the proposed action is not likely to jeopardize the continued existence of MCR steelhead.

2.1.6 Reinitiation of Consultation

This concludes formal consultation for the Coppei Creek Setback Levee and Bridge Replacement Project. Consultation must be reinitiated if: (1) the amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; (3) the action is modified in a way that causes an effect on listed species that was not previously considered; or (4) a new species is designated that may be affected by the action (50 C.F.R. 402.16). To reinitiate consultation, the COE should contact the Habitat Conservation Division (Washington Branch Office) of NOAA Fisheries.

2.2 Incidental Take Statement

Section 9 of the ESA and Federal regulation pursuant to section 4 (d) of the Act prohibit the take of endangered and threatened species without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined as significant habitat modification or degradation that results in death or injury to listed species by "significantly impairing behavioral patterns such as breeding, spawning, rearing, migrating, feeding, and sheltering" (50 C.F.R. 222.102). Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such takings is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the effects of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize take and sets forth terms and conditions with which the action agency must comply to implement the reasonable and prudent measures.

2.2.1 Amount or Extent of the Take

NOAA Fisheries anticipates that the proposed action is reasonably certain to cause incidental take of MCR steelhead. Despite the use of the best scientific and commercial data available, NOAA Fisheries cannot estimate a specific amount of incidental take of individual fish. However, NOAA Fisheries believes take will occur in the form of temporary habitat modification through sedimentation that will occur at the construction site and extend several hundred feet downstream. In addition, habitat modification will occur within the footprint of the existing bridge footing that will be removed under the proposed actions (although the extent of these effects will be moderated overtime as footing removal is intended to contribute to restoring habitat forming processes that are presently prevented by the existence of concrete footings). Furthermore, habitat modification will decrease existing floodplain capacity on the right hand bank of Coppei Creek (although the effect of lost floodplain capacity would be moderated by the extent to which the opposite bank already fills that capacity). Finally, habitat modification would occur in the form of vegetation removal and related loss of riparian function in the footprint of the new retaining wall construction (although lost vegetation will be moderated over time by replanting).

2.2.2 Reasonable and Prudent Measures

The following reasonable and prudent measures (RPM's) are necessary and appropriate to minimize take of MCR steelhead. These RPM's are partially integrated into the BA and proposed project. NOAA Fisheries has included them here to provide further detail as to their implementation.

1. The COE will minimize the incidental take from construction activities at the SR 12 bridge replacement, by limiting the duration, timing and extent of in-water work.

2. The COE will minimize incidental take from construction activities in or near the creek by protecting water quality.

3. The COE will minimize incidental take by taking measures to minimize impacts to riparian and instream habitat or by replacing or restoring lost riparian and instream function.

4. The COE will minimize incidental take by requiring monitoring of all erosion control measures and plantings for site restoration during and following construction to meet criteria as described below in the terms and conditions.

2.2.3 Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the COE must comply with the following terms and conditions, which implement the RPM's described above. Implementation of the terms and conditions within this BO will further reduce the risk of impacts to fish and their habitat. These terms and conditions are non-discretionary.

1. To implement RPM No. 1 (in-water work) above, the COE shall ensure that:

1.1 Passage shall be provided for both adult and juvenile forms of MCR steelhead throughout the construction period.

1.2 All work within the active channel of Coppei Creek will be completed between July 15th and September 30th. Staging plans for temporary waterway diversions will be submitted and approved by COE Environmental Staff prior to proceeding with associated in-water activities. Any additional extensions of the in-water work period will first be approved by, and coordinated with, NOAA Fisheries and WDFW.

1.3 All in-water work will be isolated by a cofferdam (sand bags), or the stream shall be routed through a culvert, to minimize the potential for sediment entrainment. If a cofferdam is used, any fish trapped in the isolation pool will be removed prior to dewatering, using NOAA Fisheries approved methods.

1.3.1 If possible, fish will be captured by seining under the supervision of a fishery biologist experienced in such efforts and all staff working with the seining operation must have the necessary knowledge, skills, and abilities to ensure the safe handling of all ESA-listed fish.

1.3.2 If seining is not possible, fish may be captured using electrofishing gear as described in NOAA Fisheries guidelines (NMFS 2000). No electrofishing may occur if water temperatures exceed 18° C, or are expected to rise above this temperature before concluding the capture.

1.3.3 ESA-listed fish must be handled with extreme care and kept in water to the maximum extent possible during capture and transfer procedures. The transfer of ESA-listed fish must be conducted using a sanctuary net that holds water during transfer, whenever necessary to prevent the added stress of an out-of-water transfer.

1.3.4 No fin clipping or use of anaesthetics is authorized for MCR steelhead.

1.3.5 Captured fish must be released in appropriate habitat, as near as possible to the capture site.

1.3.6 Within three months of any fish removal activities, the COE shall provide a report to NOAA Fisheries that contains all of the information for reporting take that is contained in the 2001 Washington Department of Fish and Wildlife Scientific Taking Permit application.

1.4 Alteration or disturbance of stream banks and existing riparian vegetation will be minimized. Where bank work is necessary, bank protection material shall be placed to maintain normal waterway configuration.

1.5 During excavation, native streambed materials will be stockpiled out of the two-year floodplain for later use in backfilling the trenches used to construct the coffer dams.

1.6 Any water diversions or withdrawals done for the purpose of supplying water for construction or for riparian plantings will comply with all state and federal laws, particularly those that require a temporary water right and fish screening of intakes. The COE shall be responsible for informing all contractors of their obligations to comply with existing, applicable statutes.

2. To implement RPM No. 2 (construction activities), the COE shall ensure that all erosion and pollution control measures included in the BA are included as special provisions in the Coppei Creek Setback Levee and Bridge Replacement contract. COE will prepare an erosion control plan (ECP). The ECP will outline how and to what specifications various erosion control devices will be installed to meet water quality standards, and will provide a specific inspection protocol and time response. Erosion control measures shall be sufficient to ensure compliance with applicable water quality standards and this BO. The ECP shall be maintained on site and shall be available for review upon request.

2.1 Effective erosion control measures shall be in-place at all times during the contract. Construction within the project vicinity will not begin until all temporary erosion controls (e.g., sediment barriers and containment curtains) are in place.

2.2 All exposed areas will be replanted with a native seed mix. Erosion control planting will be completed on all areas of bare soil within 14 days of completion of construction.

2.3 All equipment that is used for instream work will be cleaned prior to entering the two year floodplain. External oil and grease will be removed, along with dirt and mud. Untreated wash and rinse water will not be discharged into streams and rivers without adequate treatment.

2.4 Material removed during excavation shall only be placed in upland locations, at least 50 feet from the two year floodplain, where it cannot enter the permitted work area or any other waters of the state of Washington. Conservation of topsoil (removal, storage and reuse) will be employed.

2.5 Measures will be taken to prevent construction debris from falling into any aquatic habitat. Any material that falls into a stream during construction operations will be removed in a manner that has a minimum impact on the streambed and water quality.

2.6 Project actions will follow all provisions of the Clean Water Act (40 C.F.R. Subchapter D).

2.7 The Contractor will develop an adequate, site-specific Spill Prevention and Countermeasure or Pollution Control Plan (PCP), and is responsible for containment and removal of any toxicants released. The Contractor will be monitored by the COE to ensure compliance with this PCP. The PCP shall include the following:

> 2.7.1 A site plan and narrative describing the methods of erosion/sediment control to be used to prevent erosion and sediment for contractor's operations related to disposal sites, borrow pit operations, haul roads, equipment storage sites, fueling operations, and staging areas.
>
> 2.7.2 Methods for confining and removing and disposing of excess construction materials, and measures for equipment washout facilities.
>
> 2.7.3 A spill containment and control plan that includes: Notification procedures; specific containment and clean up measures which will be available on site; proposed methods for disposal of spilled materials; and employee training for spill containment.
>
> 2.7.4 Measures to be used to reduce and recycle hazardous and non-hazardous waste generated from the project, including the following: Types of materials, estimated quantity, storage methods, and disposal methods.
>
> 2.7.5 The person identified as the Erosion and Pollutant Control Manager shall also be responsible for the management of the contractor's PCP.

2.8 Areas for fuel storage, refueling, and servicing of construction equipment and vehicles will be at least 50 meters from the stream channel and all machinery fueling and maintenance will occur within a contained area. Overnight storage of vehicles and equipment must also occur in designated staging areas.

2.9 Equipment refueling and storage areas will have hydrologic function restored (e.g., ripping or subsoiling) in areas where it has been degraded.

2.10 No surface application of nitrogen fertilizer will be used within 50 feet of any water body.

3. To implement RPM No. 3 (riparian habitat protection), the COE shall ensure that:

   3.1 Alteration of native vegetation will be minimized. Where native vegetation will be altered, measures will be taken to ensure that roots are left intact. This will reduce erosion while still allowing room to work. No protection will be made of invasive exotic species (e.g. Himalayan blackberry), although no chemical treatment of invasive species will be used.

   3.2 Riparian vegetation removed will be replaced with a native seed mix, shrubs, and trees. Replacement will occur within the project vicinity at a replanting ratio of 3:1.

4. To implement RPM No. 4 (monitoring), the COE shall ensure that:

   4.1 Erosion control measures as described above in RPM No. 2 shall be monitored.

   4.2 All significant riparian plantings will be monitored to ensure the following:

      4.2.1 Finished grade slopes and elevations will perform the appropriate role for which they were designed.

      4.2.2 Plantings are performing correctly and have an adequate success rate (success rate depends on the planting density, but the goal is to have a functional riparian vegetation community).

   4.3 Failed plantings and structures will be replaced as warranted.

   4.4 By December 31 of the year following the completion of construction, the COE shall submit to NOAA Fisheries (Washington Branch) a monitoring report with the results of the monitoring required in terms and conditions 4.1 to 4.3 above.

3.0 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

3.1 Background

The MSA, as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), established procedures designed to identify, conserve, and enhance EFH for those species regulated under a Federal fisheries management plan. Pursuant to the MSA:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH (§305(b)(2));

- NOAA Fisheries must provide conservation recommendations for any Federal or State action that would adversely affect EFH (§305(b)(4)(A));

- Federal agencies must provide a detailed response in writing to NOAA Fisheries within 30 days after receiving EFH conservation recommendations. The response must include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with NOAA Fisheries EFH conservation recommendations, the Federal agency must explain its reasons for not following the recommendations (§305(b)(4)(B)).

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting this definition of EFH: Waters include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities; necessary means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50 C.F.R. 600.10). Adverse effect means any impact which reduces quality and/or quantity of EFH, and may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey or reduction in species fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 C.F.R. 600.810).

EFH consultation with NOAA Fisheries is required regarding any Federal agency action that may adversely affect EFH, including actions that occur outside EFH, such as certain upstream and upslope activities.

The objectives of this EFH consultation are to determine whether the proposed action would adversely affect designated EFH and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH.

3.2 Identification of EFH

Pursuant to the MSA the Pacific Fisheries Management Council (PFMC) has designated EFH for three species of federally-managed Pacific salmon: chinook; coho (*O. Kisutch*); and Puget Sound

pink salmon (*O. gorbuscha*)(PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC 1999), and longstanding, naturally-impassable barriers (i.e., natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based, in part, on this information.

3.3 Proposed Actions

The proposed action and action area are detailed above in Section 1.2 and 1.3 of this BO. The action area includes habitats that have been designated as EFH for various life-history stages of chinook and coho salmon.

3.4 Effects of Proposed Action

As described in detail in Section 2.1.3 of this BO, the proposed action may result in short- and long-term adverse effects to a variety of habitat parameters. These adverse effects include sediment mobilization, increased turbidity, and disturbance to riparian vegetation.

3.5 Conclusion

NOAA Fisheries concludes that the proposed action would adversely affect designated EFH for chinook and coho salmon.

3.6 EFH Conservation Recommendations

Pursuant to Section 305(b)(4)(A) of the MSA, NOAA Fisheries is required to provide EFH conservation recommendations to Federal agencies regarding actions which may adversely affect EFH. While NOAA Fisheries understands that the conservation measures described in the BA will be implemented by the COE, it does not believe that these measures are sufficient to address the adverse impacts to EFH described above. However, the Terms and Conditions outlined in Section 2.2.3 are generally applicable to designated EFH for chinook and coho salmon, and address these adverse effects. Consequently, NOAA Fisheries recommends that they be adopted as EFH conservation measures.

3.7 Statutory Response Requirement

Pursuant to the MSA (§305(b)(4)(B)) and 50 C.F.R. 600.920(j), Federal agencies are required to provide a detailed written response to NOAA Fisheries' EFH conservation recommendations within 30 days of receipt of these recommendations. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity on EFH. In

the case of a response that is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

3.8 Supplemental Consultation

The COE must reinitiate EFH consultation with NOAA Fisheries if the proposed action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 C.F.R. 600.920(k)).

4.0 REFERENCES

Berg, L., and T.G. Northcote. 1985. Changes in territorial, gill-flaring, and feeding behavior in juvenile coho salmon (*Oncorhynchus kisutch*) following short-term pulses of suspended sediment. Canadian Journal of Fisheries and Aquatic Sciences 42:1410-1417.

Bisson, P.A., and R.E. Bilby. 1982. Avoidance of suspended sediment by juvenile coho salmon. North American Journal of Fisheries Management 4:371-372.

Bottom, D.L., P.J. Howell, and J.D. Rodgers. 1985. The effects of stream alterations on salmon and trout habitat in Oregon. Oregon Department of Fish and Wildlife, 70 p.

Busby, P.J., T.C. Wainright, G.J. Bryant, L. Lierhimer, R.S. Waples, F.W. Wakintz, and I.V. Lagomarsino. 1996. Status review of west coast steelhead from Washington, Oregon, and California. US Department of Commerce, NOAA Technical Memo NMFS-NWFSC-27, 261 p. http://www.nwfsc.noaa.gov/pubs/tm/tm27/tm27.htm; Accessed 12/4/01.

Chapman, D., C. Peven, T. Hillman, A. Giorgi, and F. Utter. 1994 Status of summer steelhead in the mid-Columbia River. Don Chapman Consultants, Inc. 318 p. (Available from Don Chapman Consultants Inc. 3653 Rickenbacker, Suite 200, Boise, ID 83705)

Confederated Tribes of the Umatilla Indian Reservation (CTUIR). 1999. BPA Fish & Wildlife Program FY99 Proposal Form: Walla Walla Basin Fish Habitat Enhancement. http://www.efw.bpa.gov/Environment/EW/PROPOSALS/AIWP/1999/9604601.pdf; Accessed 12/3/01.

Gregory, R.S., and T.S. Northcote. 1993. Surface, planktonic, and benthic, foraging by juvenile chinook salmon (*Oncorhynchus tshawytscha*) in turbid laboratory conditions. Canadian Journal of Fisheries and Aquatic Sciences 50:223-240.

Kuttel, M. 2001. Salmonid habitat limiting factors, Water resource inventory area 32, Walla Walla Watershed. Washington State Conservation Commission. Lacey, Washington. 171 p.

Light, J. T. 1987. Coastwide abundance of North American steelhead trout. (Document submitted to the annual meeting of the INPFC. Fisheries Research Institute Report FRI-UW-8710. University of Washington, Seattle, 18 p.

McClure, B. Sanderson, E. Holmes, C. Jordan, P. Kareiva, and P. Levin. 2000. Revised Appendix B of standardized quantitative analysis of the risks faced by salmonids in the Columbia River basin. National Marine Fisheries Service, Northwest Fisheries Science Center, Seattle, Washington. September.

Mendel, G., D. Karl, and T. Coyle. 2000. Assessment of salmonid fishes and their habitat conditions in the Walla Walla River basin of Washington: 1999 Annual Report. Washington Department of Fish and Wildlife Report. Report #FPA 00-18. 86 p.

NMFS. 1996. Making Endangered Species Act determinations of effect for individual and grouped actions at the watershed scale. Habitat Conservation Program, Portland, Oregon, 32 p.

NMFS. 1999. The Habitat Approach: Implementation of Section 7 of the Endangered Species Act for actions affecting the habitat of Pacific anadromous salmonids. Guidance memorandum from Assistant Regional Administrators for Habitat Conservation and Protected Resources to staff. 12 p. http://www.nwr.noaa.gov/1habcon/habweb/pubs/newjeop9.pdf; Accessed 12/9/01.

NMFS. 2000. Guidelines for electrofishing waters containing salmonids listed under the Endangered Species Act. Protected Resources Division, Portland, Oregon, 5 pp. http://www.nwr.noaa.gov/1salmon/salmesa/4ddocs/final4d/electro2000.pdf; Accessed 12/11/01

PFMC. 1999. Amendment 14 to the Pacific Coast Salmon Plan. Appendix A: Description and Identification of Essential Fish Habitat, Adverse Impacts and Recommended Conservation Measures for Salmon. Portland, Oregon.

Raleigh, R.F., T. Hickman, R.C. Solomon, and P.C. Nelson. 1984 Habitat Suitability Information: Rainbow trout. US Department of the Interior, Fish and Wildlife Service. FWS/OBS 82/10.60.

Servizi, J.A., and D.W. Martens. 1987. Some effects of suspended Fraser River sediments on sockeye salmon (*Oncorhynchus nerka*), p. 254-264. *In* H.D. Smith, L. Margolis, and C.C. Wood [ed.] Sockeye salmon (*Oncorhynchus nerka*) population biology and future management. Special Publication of the Canadian Journal of Fisheries and Aquatic Sciences 96.

Sigler, J.W., T.C. Bjornn, and F.H. Everest. 1984. Effects of chronic turbidity on density and growth of steelhead and coho salmon. Transactions of the American Fisheries Society 113:142-150.

Spence, B.C., G.A. Lomnicky, R.M. Hughes, R.P. Novitzki. 1996. An ecosystem approach to salmonid conservation. Man Tech Environmental Research Services Corp. Corvallis, Oregon. http://www.nwr.noaa.gov/1habcon/habweb/ManTech/front.htm#TOC; Accessed 12/4/01.

Swindell, E.G. 1942. Report on source, nature and extent of the fishing, hunting and miscellaneous related rights of certain Indian Tribes in Washington and Oregon together with affidavits showing locations of a number of usual and accustomed fishing grounds and stations. United States Department of the Interior, Office of Indian Affairs, Los Angeles, California. 483 p.

US Fish and Wildlife Service and NMFS. 1998. Endangered Species Consultation Handbook: Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. US Government Printing Office. Washington D.C.

Washington Department of Ecology (WDOE). 1998. The 303(d) List of Impaired and Threatened Water bodies. Washington Department of Ecology. http://www.ecy.wa.gov/programs/wq/303d/1998/1998-index.html; Accessed 7/5/2002.

Washington Department of Fisheries (WDF), Washington Department of Wildlife (WDW), and Western Washington Treaty Indian Tribes (WWTIT). 1993. 1992 Washington State salmon and steelhead stock inventory (SASSI). Washington Department of Fish and Wildlife. Olympia, Washington. 212 p. and 5 regional volumes.
http://www.nwfsc.noaa.gov/pubs/tm/tm27/tm27.htm; Accessed 12/3/2001.

Washington Department of Fisheries and Wildlife (WDFW). 2000. Integrated streambank protection guidelines.
http://www.wa.gov/wdfw/hab/ahg/ispgdoc.htm#ch1; Accessed 12/19/2001.

Wydoski, R.S. and R.R. Whitney. 1979. Inland fishes of Washington. University of Washington Press. Seattle, Washington.

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July 25, 2002

Walla Walla District Corps of Engineers
Attn: Steve Fink
201 N. 3rd Avenue
Walla Walla, WA 99362

RE: Coppei Creek Flood Control Project/Flood Control District

Dear Steve:

This follows our recent telephone conversation. Dan Bickelhaupt advised me that the Flood Control District is willing to proceed with the Coppei Flood Control project. For that purpose, they anticipate a bond to cover their share of the cost. That requires adoption of a budget, which in turns require a good estimate of the actual cash that the District will need. To further this process, we would like to meet in the near future for the purpose of developing a precise number that the District can use in their budget planning.

I would appreciate if you would contact me as soon as possible for this purpose.

Very truly yours,

William E. Bloor

WEB:dmd
Cc: Dan Bickelhaupt
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STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

4601 N. Monroe, Suite 202 • Spokane, Washington 99205-1295 • (509) 456-2926

October 2, 2002

Mr. Peter F. Poolman, Chief
Environmental Compliance Section
Walla Walla District
U.S. Army Corps of Engineers
201 N. Third Ave
Walla Walla, WA 99362-1876

Dear Mr. Poolman:

This letter is in response to your request for Water Quality Certification per Section 401 of the Clean Water Act for the Coppei Creek Flood Control Project in Waitsburg, Washington. The purpose of the proposed project is to reduce the risk of flood damage to the city of Waitsburg. The proposed project includes the construction of a setback levee and flood retaining wall on the right bank of Coppei Creek as well as the replacement of the existing SR 12 bridge over Coppei Creek, while avoiding or minimizing adverse environmental impacts.

Your letter of May 30, 2002 requests Section 401 certification based on Ecology's partial denial of Nationwide Permit (NWP) No. 14, "Linear Transportation Crossings". The Final Draft on the Coppei Creek Flood Control Project listed the need for a Hydraulics Project Approval (HPA) from DOFW. In response to that request I met on the bridge site with Washington State Department of Transportation (WADOT) and Washington State Department of Fish & Wildlife (DOFW) personnel. We discussed and reviewed the project. We agreed at that meeting that the bridge portion of the Coppei Creek Flood Control Project, while requiring an HPA, does not require 401 Water Quality Certification. Ecology and WADOT have adopted an Implementing Agreement regarding compliance with State of Washington Surface Water Quality Standards that describes and requires BMP's and conditions of approval that will ensure compliance with the aquatic laws and regulations of the State of Washington.

401 water Quality Certification was not requested for the setback levee and floodwall portion of the project. Based on our review of the text and plans provided, communication with DOFW and WADOT personnel and the conditions of approval contained in the Biological Opinion (BO) issued by the National Marine Fisheries Service (NMFS) we believe that this portion of the project will not have significant adverse effects on the water quality of Coppei Creek.

Please note this waiver does not exempt, and is provisional upon compliance with other statutes and codes administered by federal, state, and local agencies. Please feel free to call me at (509) 625-5185, if you have questions.

Sincerely,

Michael W. Maher

Michael W. Maher, Shoreline Specialist
Shorelands and Environmental Assistance Program

cc: Mark Reynolds, WADOT
Mark Grandstaff, WDFW
Linda Carter, ACE

Public Scoping Meeting
Coppei Creek Flood Control Project
October 27, 1999

Dave Dankel, Corps of Engineers, welcomed the attendees. He explained that the purpose of the meeting were to provide an opportunity for interested parties to ask questions and identify concerns regarding the proposed flood control improvements along the Coppei Creek. These improvements would include replacing the Coppei Creek Bridge on Highway 12 and construction of a setback levee adjacent to the Coppei.

Mayor Zuger also welcomed the attendees and provided comments...

The construction of the setback levee and the study schedule were outlined by Steve Fink, Corps of Engineers.

A summary of the bridge replacement was given by Leonard Pittman, Washington Department of Transportation.

A panel, consisting of Steve Fink, Leonard Pittman, Linda Carter, and Yvonne Gibbons, was assembled for a question and answer session.

Attendees were split into two groups for the purpose of identifying specific concerns about the proposed project. Each attendee identified two concerns which they considered most important. The issues identified are listed below with the number of votes accumulated. (Issues that were identified and voted on in both groups have been combined.)

(15)The creek should be dredged from above town through to the Touchet and the dredged material should be used to build dikes. The activity should be coordinated with US Department of Fish and Wildlife
(8) Flood Protection on the south-west side of the Coppei, near lower 7th
(5) Keep Coppei within current banks
(5) SR 12 bridge flood capacity
(5) Creek bank rehabilitation 1 mile upstream
(3) Minimize parking lot impact at the fairgrounds
(3) Maintenance of completed project
(3) Keep driveway access, sidewalks and vegetation along hwy 12
(3) Safety at the Bridge and concrete walls
(3) 7th street bridge flood capacity
(2) Meinburg Bridge, upstream, has a lower capacity
(2) Consider alternatives to building levee in Huwe pasture
(2) Don't divert the Coppei through town to Touchet
(1) Noxious weeds brought in by flooding
(1) Retain aesthetic and cultural aspects of the bridge
(0) Consider alternative routes, around fair grounds and lower Waitsburg road
(0) Life Expectancy of the setback levee

The results of the scoping sessions were presented to the entire group.

Dave Dankel thanked everyone for coming to the meeting and giving their input on the flood control project. All attendees were invited to contact Steve Fink by telephone or by mail with any additional comments or concerns that arise in the future. After the meeting ended, there was an opportunity to talk with the presenters and panel members individually.

Comments for the Panel

Q: Has any consideration been given to repairing the damage at the point where the creek left the channel?
A: We will look into it.

Q: How long will the temporary bridge be in place, and how tall will the retaining wall be?
A: The work will be done in summer, the bridge would be in place for about 3 months. The retaining wall height depends on the height of the bridge girders, about 5ft.

Q: What alternatives are there to running the levee through the Huwe pasture?
A: We have looked at other alignments, take a look at the map and give us your input about where it should go.

Q: Will the levee at be a barrier to people with trailers in the fairgrounds parking lot?

Q: What about putting a concrete channel around the waterway or dredging the stream?
A: Concrete channels are expensive, steelhead in the stream make precludes dredging as a possibility.

Comment: Federal agencies are acting together and not giving people what they want. The people should join together and change the law so we can do the practical thing (dredge the streams).

Q: We are building the bridge 5 feet higher, how long until it needs to be made higher again?
A: Forseeably we will not have to build it higher, if we allow the stream enough room, it will move more slowly along most of its path and will not slow down under the bridge and drop a lot of sediment.

Q: What good does it do to have a tall bridge when the one upstream is even smaller?

Q: Why can't the levee be farmed over?

A: The flatter we build it, the wider it will need to be. Farming will take height off the levee very quickly.

COPPEI CREEK FLOOD CONTROL PROJECT

WAITSBURG, WASHINGTON

PUBLIC RESPONSE COMMENT PACKAGE

July 2002

Coppei Creek Flood Control Project
Waitsburg, Washington

Coppei Creek Flood Control Project

Consolidated Responses to Public Questions and Comments

1. What is the Corps of Engineers' Coppei Creek Flood Control Project?

    - The Corps project consists of (1) a 1,670 foot offset levee and a 460 foot floodwall, upstream of the US Highway 12 Bridge across Coppei Creek and (2) a 400 foot floodwall and a 1,740 foot offset levee downstream of the US Highway 12 Bridge across Coppei Creek. The offset levees and floodwalls are only on the right bank of Coppei Creek.

      The Corps project was designed for a flow of 2,000 cfs that is the 1-percent chance exceedance flood (100-year flood) for Coppei Creek at the US Highway 12 location. The design was based on channel and overbank flow capacity and vegetation growth level conditions that existed in July 1999 when the channel and overbank land surveys were performed for this study. That was only three years after the Coppei Creek channel and debris cleanup that took place after the 1996 flood event. Thus the channel and overbank areas were relatively free of excess sediment, debris, and vegetation.

    - The Washington State Department of Transportation will replace the existing US Highway 12 Bridge with a new one that has more flow capacity. The bridge is not part of the Corps project but it is sized around the design capacity of the Corps project. This proposed bridge will not be arched, as the previous one is, and will have a 50-foot clear span. The new bridge will have a proposed opening area of 325 square feet as compared to 125 square foot opening of the old bridge.

2. What is the purpose of the Coppei Creek Flood Control Project and what is the level of protection afforded by the project?

- The purpose of the Coppei Creek Flood Control Project is to prevent Coppei Creek flood water from entering the City of Waitsburg for the 1-percent chance exceedance flood (100-year flood) and smaller floods. Flood water will be forced to stay in the Cóppei Creek channel and floodway. During flood events such as 1965 and 1996, Coppei Creek flood flows entered the City upstream of the US Highway 12 Bridge. The project, as described above, will keep the entire 1-percent chance exceedance flood (100-year flood) in the Coppei Creek channel and right overbank and will prevent approximately one-fourth of the flood water from proceeding north, upstream of and on US Highway 12, into Waitsburg. The offset levees and floodwalls provide three feet of freeboard above the 1-percent chance exceedance flood (100-year flood) energy grade line elevation.

The scope of this project included flooding caused only by Coppei Creek. Neither the Touchet River nor Wilson Creek flooding are within the scope of this project. Any proposed work or alterations in the active channel were kept to a minimum to avoid, as much as possible, destabilizing the channel.

- The proposed Washington State Department of Transportation bridge opening will provide a minimum of one foot of clearance at the proposed bridge for the 1-percent chance exceedance flood (100-year flood) energy grade line. The new bridge opening is about two and a half times larger than the old bridge opening. The old bridge opening has a cross-sectional area of approximately 125 square feet while the proposed bridge opening area is greater than 325 square feet. The slope of the bottom of the channel through the bridge will not be disturbed; instead the US Highway roadway will be raised.

3. How will the levees, floodwall and new bridge perform under high flow conditions?

- Upstream of the US Highway 12 Bridge the offset portion of the upstream levee will serve to direct flows upstream of the bridge into the existing channel. Flood flows greater than the upstream channel capacity, having approximately a four percent annual exceedance probability (25-year), and less frequent events, would be in contact with the upstream portion of the levee.

Much of the offset upstream portion of the levee will be protected by a geo-fabric that can withstand velocities of up to nine feet per second. The portion of the upstream levee closer to the proposed floodwall will have riprap, toed in, at the base of the levee.

For the design flood and smaller flows both the upstream portion of the levee and the floodwall will direct all of Coppei Creek floodwaters through the bridge with an approximate average channel velocity of eight feet per second. The larger bridge opening and higher velocity flows will reduce upstream ponding and should allow for sediment and bedload to move through the channel more efficiently.

- Downstream of the US Highway 12 Bridge, the floodwall will keep high velocity flows in the main channel reducing the possibility of a

channel avulsion. Should a channel avulsion occur on the right bank of the channel; the downstream offset levee will direct this flow back to the channel upstream of the Seventh Street Bridge.

- The expected performance of the Corps project is based on the channel and overbank conditions that existed in July 1999; at the time Land Surveys were done. Under these conditions, modeled flows, for the one-percent flood and smaller floods, do not overtop Coppei Creek's left channel bank for the entire length of the Corps levee and floodwall project.

If additional channel vegetation or other flow obstructions (above the July 1999 Levels) exist in the channel or overbank areas; water surface elevations during floods would be expected to be higher and might result in potential flooding of left overbank areas. The left bank area with the highest risk of flooding would be near the Seventh Street Bridge.

4. Will changes be made to Waitsburg's Flood Insurance Rate Maps and Floodway Maps and what does the term "floodway" mean?

Adopted, post-project, floodway limits must be observed. Waitsburg would adopt a new floodway, after project approval and prior to project construction. The term floodway or more formally "Regulatory Floodway" means the channel of a river

or other watercourse and the adjacent land areas that must be preserved in order to discharge the base (one-percent chance) flood without cumulatively increasing the water surface elevation more than a designated height (usually one-foot).

June 10, 2002

District Engineer
Walla Walla District Corps of Engineers
201 North 3rd
Walla Walla, WA 99362

Attn. Steve Fink

Please consider my comments on the Coppei Creek Flood Control Project, Detailed Project Report (DPR) and Environmental Assessment (EA).

I live along 7th Street west of the Coppie Street Bridge. I received substantial flooding during the 1996 flood as did several of my neighbors on this side of the creek. We were hoping that the flood control project would provide us with some flood protection, but it appears that our problems have been ignored, and in fact, would be made worse by the project.

Waitsburg is essentially built on an alluvial fan, and there has been historic flooding and sediment deposition over the entire fan. The project would funnel all the flood water to the west of the city and significantly increase the amount of water in our area over what it would have been pre-project. In addition it appears that the water level above the highway bridge would be raised substantially during flood conditions in order to direct all the water under the new bridge. The increased water level would reduce the velocities in the ponding area above the bridge and encourage more sediment deposition in that area.

The project will do nothing to alleviate flooding in town from Wilson Creek. This problem was not addressed.

In view of the above I would like to offer the following specific comments about the DPR and EA.

H+H 1. The additional flooding that would be caused in our area has not been addressed in either the DPR or the EA. It is unclear if they were considered in the cost-benefit analysis either.

H+H 2. The additional sedimentation above the highway bridge has not been properly addressed in either the DPR or the EA. This has implications to future maintenance problems since the sponsor will be required to maintain conveyance capacities. If this area were allowed to fill in, it seems it would be necessary to raise the bridge and levee again at some future date. If the sediment were removed, there would be substantial costs and environmental problems.

H+H 3. A flood by-pass channel that would collect part of Coppei Creek floodwater and Wilson Creek floodwater should be more fully addressed in the DPR. It is not apparent how much consideration this alternative may have been given or why it is not feasible. This would provide more protection to the City, and also to the residents to the west of town.

H+H E.C. 4. The EA did not address environmental effects of the increased sedimentation above the highway bridge, its future removal, and changes in vegetation caused by it.

H+H E.C. 5. The EA did not address the increased fears and damages associated with future flooding to the folks in my area. These concerns are real and are the primary reason for preparing these comments.

Thank you for the opportunity to provide comments.

Bob Rickel

Bob Rickel
875 W 7th Street
Waitsburg, WA 99361

Responses to Mr. Bob Rickel's letter dated June 10, 2002.

1-5. Please reference Consolidated Responses to Public Questions and Comments. The consolidated comments address all of Mr. Rickel's comments.

June 3, 2002

Walla Walla District Corps of Engineers
Environmental Compliance Section
ATTN: Linda Carter
201 No. 3rd Avenue
Walla Walla, Wa. 99362

REF: Coppei Creek Feasibility Study

This in response to your feasibility study on the Flood Control Program for the Copppei Creek at Waits burg, Wa.

Civil PM 1 As a concerned land owner I strongly oppose your current proposal of the set back levee and raising the bridge 5 feet. Number one, as the 10 foot set back levee will go across the middle of my pasture and I would not be able to keep our under ground sprinklers. Also I H+H+PM 2 understand there possible would be rock on one side and possible plant some type of brush or vegetation on the top. This is our horse pasture and that would be unacceptable.

PM 3 It seems the expense is tremendous, who is going to pay for it and who will maintain it. We know from past experience the prior levee was not maintained. Waits burg is now taxed on their Real Estate beyond what they can afford. IS Waits burgs citizens aware that they will be responsible for at least 35% to 50 % of the expense and then a maintenance fee of $5,000.00 a year. At present they are unable to pass a special levy to run their swimming pool this summer.

H+H/PM 4 Also, it seems the least expense and least damage to real estate property, the creek should be dredged like it was in the past years. The fish will survive as they did in the past. With the H+H 5 silt and erosion the creek bed will keep building so will that result in raising the bridge again in another 5 years? If another flood comes and the creek is not dredged, the set back levee will not hold it anyway and we will have water on both sides of the brume.

This proposal is a waste of every ones time and the tax payers money and once again I strongly oppose it.

Sincerely,
A concerned Property Owner
and Taxpayer

Meredith E. Huwe

Meredith E. Huwe
404 E. 10th St.
Waitsburg, Wa. 99361
509-337-6681

Responses to Ms. Meredith Huwe's letter dated June 3, 2002.

1. Please see response to Karen and Kelly Mohney's comment 1.

2. Yes, portions of the levee will have rock toe protection on the side nearest Coppei Creek. Any special considerations for your horse pasture may be considered during negotiations for the required easements.

3. Please see response to Karen and Kelly Mohney's comment 6.

4. Please reference Consolidated Responses to Public Questions and Comments.

5. Please reference Consolidated Responses to Public Questions and Comments.

Dear Sir, June 1, 2002

My name is Terry Hofer and I live 1 mile south of Waitsburg on the Coppei. I'm also the President of the Days of Real Sport, which leases the fair grounds from the City of Waitsburg.

I do have some concerns over the proposed 3 to 6-foot levee through our parking lot. I've lived, farmed and fished the Coppei my whole life. My dad and grandfather lived in the house where Gary Hofer presently lives. Going back a few years, winters were colder and ice jams could occur before the bridge; also trees coming down the creek in spring runoff would threaten the surrounding area and bridge. Every other year my dad would get the permits and dig out the gravel from underneath the bridge to make way for ice, debris and high water. We have a picture of him in the "30's" standing in the bottom of the creek about 20' from the bridge which is now only 5 feet. Someone will have to explain to me the logic in raising the bridge 5 feet when the creek bottom keeps rising.

H+H
1

During the last flood Leid's equipment crossing was the first breakout. That water pooled up around the Leid and Jones ground. The 2nd breakout was at the Leid & Danielson property line and the 3rd was by the Danielson & Filan borderline. The 1st two were fixed but not the 3rd. They said there were no funds to fix it.

H+H
Civil
2

The real damage was caused by the 2nd breakout and later joined by the 3rd. The flats on the east side of the Coppei have all been plowed for years, which has created a low spot in the center of all the flats. Therefore, all of the water from the 2nd & 3rd breakouts came down the center of the flats, which is aimed at the 1st turn of the DRS race track. Flowing on the track to the community building down the road to 10th, 8th, 7th to hwy 12 and Main St. to the park. That stream of water went through our 6-foot wall of dirt like it wasn't even standing there! In your pictures you'll note that our parking lot didn't get floodwater at all.

H+H +
Civil
3

My understanding is that you're going to take out our 6-foot wall of dirt and replace it with a 3-foot wall of dirt that is going to stop the 3rd breakout which will be at least a third of the Coppei coming down the middle of the flats. Of course, if a 6-foot wall of dirt can't hold it, I don't know why a 3-foot wall should. The only thing that I see the levee doing is to keep all of the water to the East Side of the levee and not get back to the creek. Are you planning to fill in the 10-foot ditch that returns water to the creek?

I can show you the third breakout that is going to cause a great deal of problems someday. There is already a brush pile to aim the creek toward the breakout, and God help us if a tree gets lodged across this narrow passage. The whole Coppei will be coming down our flats aimed at Waitsburg!!

PM
WSDOT
4

My landlord called the other day and told me that she had received notice that the state was surveying her land again for the bypass around Waitsburg. Of course this bypass will cut through your levee close to the fairground and force all of the water to go through the east side of the fairground and town making the levee totally useless.

H+H/PM
5

Do us all a favor and clean out the creek, put in small log or rock dams. If this creek was cleaned out and small ponds were created, it would be the best fish friendly creek in the state at a much cheaper cost!!!

Very concerned Coppei Resident,

Terry Hofer

Responses to Mr. Terry Hofer's letter dated June 1, 2002.

1. Please reference Consolidated Responses to Public Questions and Comments..

2. Agree with comment.

3. There is significant erosion protection for the proposed levee. A portion of the existing, failed levee, is to be removed. It is likely that the ditch will be filled in for the levee construction. Drainage will need to be addressed during the plans and specifications phase.

4. It is true that WSDOT was surveying to locate the bypass right of way. The bypass is still viewed as a solution to future traffic growth in the Waitsburg area, but is not likely to be built in the near future. The Washington State Department of Transportation does not own or maintain any levees. Any construction of the Waitsburg Bypass would require a thorough hydraulic analysis during the design phase of the project.

5. Please reference Consolidated Responses to Public Questions and Comments.

Dear Engineers and Co Parties,

I would like to thank you for the opportunity to voice my opinion on the feasibility study done on Coppei Creek, Waitsburg, Wa. I live 2 blocks from the proposed sight of the levees. In 1996 flood waters were in and around my home but was not just from the Coppei Creek area. The proposed levee's will do little to take care of the problems we saw in '96'. If the channel is not kept clean you will soon be building levees in the school zone. The bridge idea is great except it to will accumulate debris and make an even larger dam to flood the West end of Waitsburg instead of the Eastside.

HH (1)

If you have been reading the newspapers I'm sure you are aware of our City budget crisis. There is No way that the tax payers are going to stand for more taxes to support the upkeep of this project. If left to the city to maintain it will become one more thing that will not be done because the financing will not be available for this. It seems to me if you want to keep flooding from happening the best course of action would be to put in a secure dike system along the creek and be done with it. Much less disruptive to people's property next to the creek and a much safer solution. One that will last for a much longer time. I've seen first hand what a properly installed dike can do. I lived in Dayton, Wa. on the Touchet River next to the Golf Course during the '64' flood and know that the dike that was put in after that flood is still in place today, almost 40 years later.

PM (2)

HH,PM (3)

The time you have spent on this project was very time consuming and your efforts are appreciated. Thank You.

Sincerely,

Rose Engelbrite
P.O.Box 311
Waitsburg, Wa. 99361

Responses to Ms. Rose Engelbrite's letter postmarked June 3, 2002.

1. Please reference Consolidated Responses to Public Questions and Comments.

2. See response to Ms. Karen Mohney and Mr. Kelly Mohney letter postmarked June 3, 2002.

3. We agree that the best course of action is to construct a well engineered earth levee along Coppei Creek. We recommend a levee on the north side only, and set back to the extent possible for two main reasons. First, if we construct a levee up close to the creek channel, it will push the flow to the south bank inducing flooding on that side. This would require that a levee be built on the south bank as well. The second reason is that constructing levees on both banks would more than double the cost, and make the project not feasible.

WALLA WALLA DISTRICT
CORPS OF ENGINEERS
ENVIRONMENTAL COMPLIANCE SECTION

ATTN: LINDA CARTER
201 NORTH THIRD AVENUE
WALLA WALLA WA 99362-1876

DEAR LINDA CARTER & ASSOCIATES

Real Est PM (1) THIS LETTER IS IN RESPONSE TO THE PROPOSAL OF A SET-BACK LEVEE TO BE CONSTRUCTED 150 FT FROM THE COPPIE CREEK IN WAITSBURG. MY FIRST CONCERN WAS IMPACT THIS WOULD HAVE ON MY MOTHER, MEREDITH HUWE, AND MYSELF PERSONAL PROPERTY. IF CONSTRUCTED, THE SET BACK LEVEE WOULD CUT DIAGONAL ACROSS OUR LAND. WE WERE ADVISED THAT WE WOULD HAVE NO CHOICE AND THAT YOU WOULD ACQUIRE OUR LAND NEED BY USE OF THE CONDEMNATION LAW. WE WERE THAT TOLD THAT SOMEONE HAD TO SACRIFICE. YOU HAVE HAD YEARS AND THE FINANCIAL RESOURCES TO PUT INTO THE PROJECT AND WE ARE AWARE THAT OUR OPPOSITION WILL NOT DETOUR YOUR PLANS. WE WERE FORTUNATE ENOUGH TO ACQUIRE OUR HOME AND PROPERTY IN WHAT WE BELIEVE IS AND IDEAL LOCATION, HOWEVER IF OUR PROPERTY IS TAKEN AND RIGHT AWAY IS GIVEN TO THE CITY OF WAITSBURG, THIS WILL DEFEAT THE REASON FOR US PURCHASING THE PROPERTY TO BEING WITH. YOUR STUDY REPORT THERE WILL BE NO IMPACT MINERALS OR COMMERCIAL RIGHTS, BUT WHAT OF THE IMPACT ON THOSE CHOSEN BY YOU TO SACRIFICE?

WE NOW LOOK BEYOND OUR OWN PERONSONAL IMPACT AND LOOK AT THE SET BACK LEVEE TO WAITSBURG COMMUNITY AS A WHOLE. IF WE BELIEVED FOR 1 MINUTE THAT THE PROPOSED FLOOD CONTROL LEVEE WOULD SOLVE THE FLOODING PROBLEM OF WAITSBURG WE WOULD BE BE HIND IT. HOWEVER, THIS PROPOSAL HAS MAY DRAW BACKS THAT DO NOT FIX, OR SOLVE ANYTHING. IT'S ONLY A VERY EXPENSIVE BAND AID TO A GAPING WOUND.

PM (2) 1996 THE COPPIE CREEK BROKE THROUGH BANKS ABOVE WAITSBURG. WHY? DUE TO LACK MAITANCE ON EXTING DIKE/LEVEE. THE VOLUME OF WATER THEN PRECEDED DOWN THE MIDDLE THE FARMING FLAT TO DIRT BERM LOCATED ON THE SOUTH SIDE OF THE DAYS OF REAL SPORT GROUND. THIS BERM & CHANNEL WAS TO HOLD WATER AND DETOUR IT BACK INTO THE MAIN CHANNEL. PRETTY MUCH THE SAME CONCEPT AS PROPOSED BY THE NEW SET BACK LEVEE. SO WHY DIDN'T THIS WORK? FIRST DUE TO EROSION AND SEDIMENT THE CREEK BED IS HIGHER THAN THE CHANNEL THAT IS TO DETOUR IT BACK INTO STREAM. SECOND THE LACK OF MAINTAINED TO THE BERM ITSELF, DUE OLD TREE GROWTH WEAKEN STRUCTURE. THE DIKE BANK DIRECTLY H+H (3) BEHIND OUR PROPERTY HAS NOT BEEN MAINTAINED IN YEARS. THE CREEK HAS MOVED SOUTHWARD OVER THE YEARS AND WILL CONTINUE TO DUE SO UNTIL IT REACHES THE NEW BERN PROPOSED. WHAT DO YOU DO THEN BUILD ANOTHER? THIS MAY BE SEAM H+H, Civil (4) FAR FETCHED. BUT IS IT? WHY NOT REPAIR, IMPROVE AND MAINTAIN STRUCTURE S ALREADY IN PLACE TO PROTECT ALL.

GRANTED THE OLD BRIDGE 12/666 ON HIGHWAY 12 INTO WAITSBURG MAY BE OUT

M+H DATED, BUT HAS NOTING TO DO WITH FLOOD CONTROL. THE NEW BRIDGE IS ONLY TO BE RAISED 5 FEET. AGAIN THIS IS ONLY A TEMPORARY SOLUTION TO REDUCE FLOODING PROBLEM. RAISING THE BRIDGE DOES NOT SLOW THE BOTTOM OF THE CREEK, STOP EROSION, OR STOP THE DEPOSITS OF MATERIAL AT THE BASE OF THE BRIDGE, WHICH IN A FEW YEARS AGAIN WILL REDUCE THE WATER FLOW.
(5)

PM (6) THESE ARE BUT A FEW OF THE QUESTIONS AND CONCERNS BROUGHT TO MIND AFTER READING YOUR FLOOD CONTROL PLAN. ANOTHER IS FINANCIAL. WAITSBURG AS A HOLE SUPPORTING THE PROPOSAL. WE CURRENTLY WOULD NOT PASS A TAX HIKE LEVEE FOR FUND MUCH SMALLER THAN THIS FLOOD PROPOSAL.

PM + WSDOT. (8) IT WAS BROUGHT TO MY ATTENTION THAT EFFECTED LAND OWNER OF THE PROPOSED HIGHWAY 12 BY PASS OF WAITSBURG IS UNDER SURVEY THE BY PASS WOULD MAKE THE SET BACK LEVEE A MOOT POINT BECAUSE IT WOULD THROUGH IT AND MAKE NEW BRIDGE PROPOSED OBSOLETE.

AS A LANDOWNER, BUSINESS OWNER, TAX PAYER PLEASE FIND SOLUTIONS NOT TEMPORARY PATCHES. SO WE CAN SUPPORT WAITSBURG AND LOVE THE QUALITY OF LIFE OF IT COMMUNITY

SINCERELY.

Karen & Kelly Mohney

KAREN AND KELLY MOHNEY

Response to Ms. Karen Mohney and Mr. Kelly Mohney letter postmarked June 3, 2002.

1. It is true that the proposed alignment will cut through your mother's property. The exact alignment for the levees and floodwalls will be developed during the next project phase: plans and specifications. Part of the design process will be to determine the impacts to properties in the project footprint, and do our best to address those impacts. Consideration will be given to interior drainage, existing irrigation, existing water rights, fencing, etc. that will be impacted by project construction. The non-Federal sponsor will be required to work with you and acquire any necessary easements for project construction and operation.

2. The non-Federal sponsor will be required to perform project maintenance for project features (levee, floodwalls, drainage ditches) within the project limits. The Corps will perform periodic inspections and inform the non-Federal sponsor of any deficiencies.

3. Please reference Consolidated Responses to Public Questions and Comments.

4. The materials in the existing levee are inadequate to prevent erosion and levee failure.

5. Please reference Consolidated Responses to Public Questions and Comments.

6. There is no question that this project will take the community's financial support. And equally clear that the project will require periodic maintenance. But consider this: the cost to the community for implementing this project is about 20% of the total project cost.

7. Regardless of the Washington State Department of Transportation's plans for a bypass, in order to provide flood protection to Waitsburg from Coppei Creek, the existing bridge will need to be replaced.

Phillip Monfort P.O. Box 91 Waitsburg, WA 99361

May 24, 2002

Peter F. Poolman, Chief Environmental Compliance Section
Planning, Programs, and Project Management Division
Department of the Army
Walla Walla District Corps of Engineers
201 North Third Avenue
Walla Walla, WA 99362

RE: Coppei Creek flood control measures near Waitsburg, WA

Dear Mr. Poolman:

H+H 1

My one question to your entire plan is: What are you going to do when the bottom of the creek bed fills up more than it is at present? You surely know that it will.

Mr. Hofer, when living, cleaned out under the Coppei Creek Bridge and below each year to where he was able to drive his D-4 cat dozer underneath the bridge. This prevented any flooding problems except for ice jams that were broken up by dynamite. No ice has occurred as such since the 1940's.

I farmed both Danielson places, through which the creek runs, in the 1940's and 50's. These are a mile above the Waitsburg city limits. (My age is 79 years.)

H+H PM 2

Your plan will work only for a very short time and is not worth the time and monetary expenditure. In my opinion the only pragmatic and economically workable solution to prevent (or limit) the realities of future flooding By Coppei Creek is to clean out the creek channel from the city limits above the bridge to the Touchet River.

Sincerely,

Phillip Monfort

Phillip Monfort

cc: Dave Mastin
Mike Hewit

I could have had [illegible] people sign this [illegible] in agreement
P.M.

i do agree
I agree With letter, I have been ~~Hear~~ all my life. my age 92 this November I have saw 3 Floods an Mr Hofer kept the Creek open in all these years, the last Flood Would not go under because of Gravel. to my opinion is Kept the gravel from under the Bridge and Coppie Cleaned out to Bridge on road 124 to Prescott
Donald G Harris

Responses to Mr. Phil Monfort's letter dated May 24, 2002.

1. Please reference Consolidated Responses to Public Questions and Comments.

2. Please reference Consolidated Responses to Public Questions and Comments.

Broom 5/15/02

May 15, 2002

Walla Walla District
Corps of Engineers
Environmental Compliance Section
ATTN: Linda Carter
201 North Third Avenue
Walla Walla, Washington 99362-1876

Dear Ms. Carter,

Thank you for providing a copy of the Final Draft report dated April 2002, covering the Coppei Creek Flood Control project.

I acquired the property at 208 E. 10th Street in March of 2001 and have been living there since August. I was not here for any of the informational meetings, and this is the first contact I have had with the Corps regarding this project. Our property is immediately north of the creek and immediately east of Highway 12.

Please change the address in your database as per the undersigned, as the Post Office will not deliver mail with a street address.

I was raised in the subject house, and lived there until after college. I retired in August after 34 years with Bechtel as a construction manager, including at least one project in which the Corps was our client (CETAC). I am a registered professional engineer in Washington. I will enjoy my new role as a "sidewalk superintendent" observing a construction project being planned and executed, literally in my back yard.

While I was growing up, I fished and played in the creek, and observed it through all seasons of the year. The arch design of the bridge provides decreasing freeboard as the water rises, making the area vulnerable to flooding caused by the limited capacity of the bridge. This is exacerbated when debris comes down the creek during a flood. As the report implies, our neighbor used to clear out the rocks and sediment about once a year, maintaining the freeboard under the bridge. During the summer, it was easy for an adult to walk upright under the bridge, as the stream hugged the south side of the channel. There was eight to ten feet of shore on the north side under the bridge and eight or nine feet of headroom along the north edge of the creek. Clearly, the stream bed has raised significantly since then due to deposited material. Most of our yard ended in a steep bank about four or five feet above normal high water. Although our back yard was flooded a couple of times through the years, our house has escaped any flood damage. Even so, following the 1996 flood, my mother (Roberta Broom Adams), who owned the house at that time, contracted at significant expense to have the berm constructed that is there today, and to landscape the area just behind the berm. Just this year, I have seen less than a foot of freeboard under the bridge and the creek about halfway up our berm. Rains this past winter and spring seemed to have a more immediate effect on the conditions at the

bridge. I presume this is partially due to upstream vegetation damage from the Coppei fire last year.

When I moved back to Waitsburg I heard about the project to replace the bridge. I attended an informational meeting conducted by the DOT and have corresponded with them regarding my input. I am enclosing copies of this correspondence. (1) My primary suggestions have to do with not building the bridge any higher than necessary and (2) using an existing route as a detour rather than building a temporary road through our property. Elimination of the temporary bridge would not only be cheaper and less invasive, but would make it easier to tie in the flood wall in a timely manner, as well. I assume that comments and suggestions about the bridge itself should continue to be directed to the DOT. If not, please let me know to whom I should address these comments. I will also copy DOT on this letter.

Briefly, in addition to those previously expressed, the additional detail in the report has raised additional comments and concerns with the DOT project, namely:

(3) Exact limits of proposed easement
(4) Height of north approach at our driveway
(5) Overall safety associated with higher roadway near homes
(6) Drainage from the higher road
(7) Potential trapping of floodwater behind the approaches
(8) Lights and noise increases associated with higher bridge
(9) Dust, noise, and privacy mitigation to be proposed with a temporary bridge
(10) Temporary bridge is described as a possibility in some places, certainty in others
(11) Are the "historic pillars" described on page 4-8 our driveway lights?
(12) Arch design of the new bridge - potential to cut down flow area

I was not aware of the concurrent flood control project other than some word of mouth rumors until I received a copy of the report. I appreciate the efforts of the Corps in attempting to prevent another Coppei flood in Waitsburg and the coordination with the bridge project.

As I read the report, I jotted down a few notes which I will reproduce here:

(3) see above Civ I would like to have a more exact outlining of where the proposed easements would run. Assuming again that comments about the bridge should go to DOT, for the purposes of the Corps project I would like to know where the wall would run, exactly. I presume that the superimposed dotted line in the photographs is the top of the wall? Or is it the extent of the flood control easement? Could we get a reference as to where the high water mark actually is?

(13) Civ I am planning a garage construction project between our existing garage and the creek. Would there be limits as to how close my foundation could come to the wall, and if so,

14 what would be those limits? 14 Exactly which of my trees would be cut down? Can I start now?

15 I did not completely understand the alternative comparison matrix on page 3-9. I would expect that criteria H, land use and ownership would score a 5 under alternative 3 (no action) unless the score is lowered due to the possibility of a flood. If this is the case, then flooding is considered twice, both in criteria A and H.

16 The report mentions that logs and debris have been removed from the creek to keep the channel clear (Page 4-9). As part of the maintenance of this flood control channel, would this practice continue? Which entity would be responsible for this?

17 What are the homeowners' rights and responsibilities as they pertain to maintenance of trees and vegetation along the creek?

18 I'm not sure I understand the term "floodway." Is this the same as the high (non flood) water mark? On page 4-9 it says that none of the flood control structures would encroach on the floodway. If the floodway means the wetted area during the modeled flood flow, then by definition the flood control structures would be wetted.

19 On page 4-10 the riparian area near the existing berms is described as "...significantly narrower than an undisturbed one would be." At least in the area along our property line, this is not the case. The berm was built on top of the existing bank.

20 The mitigation proposed, such as planting new trees, is necessary, but it will not replace 100 year old trees. New trees will not have the same visual impact during our lifetimes.

21 I was surprised to see that Steelhead are found in the creek. I have known of Steelhead being caught in the Touchet, but I have not heard of any being caught in the Coppei.

22 The project schedule calls for plans and specifications to be prepared beginning in May 2002. Will affected property owners have an opportunity to review and comment on these plans and specifications?

EC HLH 23 The report mentions that dredging was done following the 1996 flood, but that the creek has redeposited sediments roughly equivalent of what was removed. (Appendix C, Page C-1) It appears obvious that a complete flood control plan must include periodic dredging, or else the flood control structures will quickly become the stream banks. I understand that there are environmental reasons for avoiding dredging, but I would suggest that when we are trying to get water safely out of the mountains and past a town built on an alluvial fan, we should not attempt to create fish environments in this particular stretch of the creek. I would think that sufficient habitat exists both upstream and downstream. This is a critical point. Only once in our remembrance has the Coppei ever found its way to the lower part of Waitsburg (in 1996). Prior flooding has been minor and has been confined to the property just along the creek. To me, it seems that the cause of

the 1996 flood was the cessation of dredging and maintenance of the stream bed. I don't think there will ever be enough money to build flood control projects to keep creeks in their places unless material is also periodically removed from the stream beds. Without concurrent dredging, in my opinion, the project is a waste of money. I would strongly urge the Corps to work with the environmental, fish and wildlife agencies to obtain an agreement that allows for a more effective means of flood control.

Hydro 24 Appendix B, Map 2 shows a weir running along 10th street and then turning south as it approaches the race track. As I know of no artificial feature either existing or planned in that location, I presume this refers to a modeled flow over higher ground which would not allow flood water to return to the creek once the water receded. Is this correct? If so, why doesn't the weir line cross Highway 12?

25 EC I don't understand why the flood wall would need to be set back 25 feet from the high water line. On Page C-2, the report states that the 25 foot setback would allow a larger area than the existing condition for a *more natural* bank and riparian vegetation. (my emphasis) In fact, as mentioned before, the natural condition (at least for the last 90+ years, to my knowledge) for the river bank along our property line is a steep bank immediately adjacent to our back yard. No riparian zone such as the one described existed north of the creek. I appreciate the effort to mitigate the impact to homes near the creek, but it does not seem to be necessary to set the walls this far back into our property to widen the riparian zone, then to choke it back down to the width of the bridge. I agree that there should be vegetation and trees along the stream but I think this could be done without sacrificing this much area to the project.

Civil+EC 26 Civil The mitigation plan for affected homeowners depends heavily on revegetation. I would like to have assurance that funding for the project would be continuous and that significant retention would be held to incentivize the contractor to perform the revegetation in a proper and timely manner. This is a likely area for a contractor to cut corners at the end of a job.

27 EC The wording of the easements provides a legal right for the project's removal of vegetation but they do not mention any obligation for revegetation. Is there any legal assurance for property owners that this would be done?

I appreciate the opportunity to participate and to comment on the proposed plan, and I am happy to see progress in prevention of further flooding. I look forward to receiving answers to my questions above, and I trust that the project team will do its best to address and resolve my four most important concerns:

See 25 – 1) Setback of the flood walls
See 2 – 2) Temporary bridge versus alternate route
See 1 – 3) Height of the new bridge
See 23 – 4) Plan for dredging

These are the issues that stand to have a major impact on the quality of life we experience in our current setting. If the project is deemed necessary, I am confident that it could be accomplished to meet its objective in a timely and cost effective way, while minimizing the negative effects. I am aware that there must be some pain and inconvenience for property owners, but I think it could be significantly reduced with minor changes to the plan.

Regards,

Jeff Broom
208 E. 10th Street
PO Box 828
Waitsburg, WA 99361

Responses to Mr. Jeff Broom's letter dated May 15, 2002.

1. Please reference Consolidated Responses to Public Questions and Comments.

2. The detour route is being investigated.

3. The exact limits for the easements required for project construction and future operation and maintenance will be determined during the next project phase: Plans and Specifications. Once the limits are determined, and a project cooperation agreement is signed, the non Federal sponsor will begin acquisition of those easements. This should begin about February 2003.

4. WSDOT does not have the vertical profile determined yet. The road will be designed to match the bridge, and the bridge has not been designed yet.

5. Safety will be addressed according to WSDOT guidelines.

6. There will be curb and gutter along US 12 from the new bridge all the way to the US 12/SR 124 intersection, which will prevent drainage from leaving the roadway. Drainage from the road will be removed with catch basins and a storm drain system that ties into a city storage/treatment facility.

7. A typical storm event should not generate a lot of water behind the approaches. However, this will be looked at more closely when the design is far enough along to lend itself to this analysis.

8. WSDOT guidelines will be followed to determine the impacts.

9. WSDOT will do what is required for mitigation using best management practices.

10. The temporary bridge is one possibility, but detour routes have not been decided on yet.

11. Yes, the historic pillars described are your driveway lights. The pillars will be protected from damage during construction.

12. The proposed US Highway 12 Bridge is not arched.

13. Please reference Consolidated Responses to Public Questions and Comments.

14. The exact wall location has not yet been established. An approximate dimension is shown on Plate 5, section A. We will not know the exact dimension until we have obtained detailed topographic mapping of the project reach, and have more fully developed the wall design. Similarly, we have not inventoried the trees that will need to be removed for wall and levee construction. This will occur during the plans

and specifications phase. You are not restricted by this project from proceeding with any plans that you have for property improvements.

15. You are absolutely correct in your assessment that we have double counted flooding by the lower score for impacts to land use and ownership. While this will raise the score for the no action alternative, the outcome does not change.

16. Please reference Consolidated Responses to Public Questions and Comments. The Waitsburg Coppei Flood Control District has responsibility for maintaining the channel.

17. The comment does not indicate whether the question relates to landowner rights and responsibilities after the project is constructed or just in general. State and local permits may be required for vegetation management (cutting down all of the trees along a stream for example) depending on each individual situation. Contact the Walla Walla County Planning Department for additional information.

18. Please reference Consolidated Responses to Public Questions and Comments.

19. The statement on page 4-10 that the riparian area near the existing berms is "...significantly narrower than an undisturbed one would be" is based on the potential for the site without any human impacts including, not just the existing berm, but also the developed properties along the creek. The existing riparian zone is only a few feet wide in some areas. Without human influences, the riparian zone would likely be much wider.

20. As stated in the comment, the proposed mitigation will not replace the "100 year old" trees. The cost of transplanting large trees is much higher and the success is much lower than for planting young trees. However, the statement is correct that the new trees will not have the same visual impact for many years. They will also not provide the same ecological function of large trees. These are some of the reasons why a higher number of trees or a larger area is replanted when mitigation is performed. In this case, the very narrow riparian zone along the north side of the creek upstream of the US 12 bridge would be widened by removal of the existing berm, allowing more area for trees and other vegetation to grow.

21. It is true that steelhead are found in Coppei Creek. The Walla Walla County Conservation District and others have spent thousands of dollars in recent years improving stream habitat and restoring riparian vegetation along many areas of the creek. The Washington Department of Fish and Wildlife also have documented steelhead spawning in many of the restored areas.

22. We do not provide our plans and specifications for public review and comment. However, the non Federal sponsor will be involved as the design develops, and will be invited to participate in the in-progress reviews.

23. Please reference Consolidated Responses to Public Questions and Comments.

24. Please reference Consolidated Responses to Public Questions and Comments.

25. A width of 25 feet between the ordinary high water line and a flood control structure is actually very narrow when the condition without human influences is considered. The area of concern has been developed for more than a century so it is not possible to know exactly what the area looked like prior to human influences. Other areas within the state use a much wider area for restoring riparian zones. The 25 foot width proposed is a compromise between human land use and environmental functionality. The proposed concrete wall is the preferred method of flood control for the area because it takes up much less room than a continuation of the earthen berm proposed further upstream and downstream.

26. The contractor will be responsible for any re-vegetation and survival criteria called for in the contract specifications. If for some reason the contractor does not complete the contract requirements, the government will take appropriate action against the contractor.

27. Site specific improvements desired by effected landowners (such as landscaping) should be negotiated as part easement acquisition agreements.

Fink, Steven J NWW

From: William Bloor [wbloor@gotvc.net]
Sent: Tuesday, June 04, 2002 2:00 PM
To: Fink, Steven J
Subject: (Fwd) Comments on the Coppei Creek DPR pertinent to the City

Steve:

The following a a message I received today regarding the proposed Coppei Creek project. Please review and then talk to me.

Thanks.

------- Forwarded message follows -------
Comments on the Coppei Creek DPR pertinent to the CityBill;

I asked my father-in-law Bob Rickel, a retired hydrologist and section chief of the Walla Walla District Corps of Engineers, to review the Coppei Creek DPR. Bob was kind enough to make his observation in a narrative form for me; but it speaking with him, there is an obvious degree of science, professionalism and experience in his observations.

David Philbrook

----- Original Message -----
From: Bob Rickel
To: David Philbrook
Sent: Thursday, May 30, 2002 3:08 PM
Subject: Comments on the Coppei Creek DPR pertinent to the City

Comments on the Coppei Creek DPR pertinent to the City.

H+H

1. The project would provide The City with much more flood protection from Coppei Creek, but not county folks along the creek.
It might reduce flooding in the city a little when Touchet River floods but not a lot. Flooding from Copei Creek in the county below town will be increased because more water will be in the creek. The residents along Arnold Lane may still get flooded. The overflow over 7th street will be stopped above the bridge, but water levels below the 7th street bridge will be higher because more water will be in the creek. These higher levels may still flood some residences.

H+H 2. The area above the bridge will be even more effective in trapping sediment than it currently is because the ponding area will be deeper and the velocities will be less. Eventually the levee and bridge will have to be raised again or the sediment will have to be removed. The report implies that the sponsor will remove the sediment and possibly vegetation when it

reduces capacities of the system (p6-4). Yet they don't address this
problem such addressing the magnitude of future deposition, cost of
removal, the environmental problems involved in such removal. The
report acknowledges that residents used to remove sediment from this
H area(p3-3) 3. The project sponsor WCFCD is responsible for damages
from construction and operation of the project (p6-5). Since the
project will increase flood damages to residents along Coppei Creek
below town , the there is a strong likelihood that the sponsor be
faced with future legal action because of the project. The premise
is that water was diverted from its natural drainage (through town)
and courts have upheld liability for that such action. 4. The
H environmental impact of the project does not adequately address the
impact of increased sedimentation upstream from the highway bridge,
i.e. the expected quantity and type of deposition and changes in
vegetation because of it (p4-17 Cumulative Effects states "None
anticipated"). Also it completely ignores the impact of more flood
water in the lower reach of Coppei Creek (p 4-15 Direct Effect).

------- End of forwarded message -------William Bloor

Bloor Law Offices
wbloor@gotvc.net

Responses to Email from Mr. William Bloor and Mr. Bob Rickel dated June 4, 2001.

1-4. Please reference Consolidated Responses to Public Questions and Comments. The consolidated comments address all of Mr. Rickel's comments.

APPENDIX B

HYDOLOGY

COPPEI CREEK DETAILED PROJECT REPORT

APPENDIX B

HYDROLOGY

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MAPS

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COPPEI CREEK DETAILED PROJECT REPORT

APPENDIX B

HYDROLOGY

B1.01. PURPOSE OF STUDY.

The purpose of this study is to provide supporting hydrologic and hydraulic information to determine how to keep the flood flows from the Coppei Creek channel from entering Waitsburg, Washington, through an old partially filled channel. If this happens for the 4-percent chance and larger floods, flooding would occur North of East Tenth Street, and floodwaters would proceed North to the Touchet River. This area was flooded most recently in February 1996.

B1.02. LIMITS OF STUDY.

The study limits extend along a reach of Coppei Creek from its confluence with the Touchet River to approximately 1,219 meters (4,000 feet) upstream of the U.S. Route 12 (U.S. 12) Bridge in Waitsburg, Washington. The total reach of Coppei Creek studied, measured along its centerline, is approximately 4.8 kilometers (3 miles).

B1.03. PAST STUDIES.

Previous studies of this area have included: (1) a *special flood hazard information report, Coppei Creek and Touchet River City of Waitsburg, Washington*, published by the U.S. Army Corps of Engineers (Corps), Walla Walla District, dated April 1974; (2) a *Flood Insurance Study, City of Waitsburg, Washington, Walla Walla County,* dated May 3, 1982, prepared by the Federal Emergency Management Agency and; (3) a *Flood Insurance Study, Walla Walla County, Washington, Unincorporated Areas,* prepared by the Federal Emergency Management Agency, dated June 1, 1983. These flood insurance studies did not account for flow over East Tenth Street flowing north to the Touchet River. A study was completed by the Corps, Walla Walla District, Hydrology Section, to account for flow over East Tenth Street. The report was entitled *Floodplain Management Services, Special Study, City of Waitsburg and Walla Walla County, Washington*, and was dated April 2001.

B1.04. STREAMS AND DRAINAGE AREAS.

Coppei Creek originates in the Blue Mountains and is a tributary of the Touchet River, terminating with a delta or alluvial fan upon which the town of Waitsburg is located. Flooding on alluvial fans is characterized by high velocity

flows, active processes of erosion, sediment transport and deposition, and unpredictable flow paths. Coppei Creek drains 95.8 square kilometers (37 square miles) with the total length of the drainage above Waitsburg of approximately 26 kilometers (16 miles). Elevations within the Coppei Creek basin range from 368 meters (1,208 feet) National Geodetic Vertical Datum 1929 (NGVD 29) to 1 354 meters (4,442 feet) NGVD 29.

B1.05. HYDROLOGY.

a. Climate.

The climate of the Touchet River basin, which includes Coppei Creek, is characterized by moderate mean annual temperatures but relatively large variations in temperature, low to moderate precipitation, moderate winds and sunshine, and low to moderate humidity. In general, this climate is subject to the moderating influence of prevailing westerly flow of maritime air from the Pacific Ocean, but occasional influxes of polar air masses cause brief periods of extremely cold weather.

b. Temperature.

Temperatures within the Touchet River basin exhibit a large seasonal variation with maximum temperatures rising well above 37.8 degrees centigrade (°C) [100 degrees Fahrenheit (°F)] in the summer and minimum temperatures falling below –17.8 °C (0 °F) in the winter. Table B-1 summarizes the temperature data for a station near the project for the period 1961 through 1990, where data is available.

Table B-1. Temperature Summary 1961 through 1990.

Station	Extremes Max/Min	January Average Max/Min	July Average Max/Min	Elevation (NGVD)
Dayton, Washington	46.6/-31.7 °C (114/-25 °F)	4.4/-3.3 °C (40/26 °F)	30.6/12.8 °C (87/55 °F)	474.6 meters (1,557 feet)

c. Precipitation.

Moist maritime air masses moving inland from the Pacific Ocean deliver most of the precipitation in the Touchet River basin in the late fall, winter, and spring months, but are rare in the summer months. This causes a large seasonal variation in the precipitation within the basin with less than 13 percent arriving in the period June through August. Summer precipitation is usually the result of convective activity in the mountainous areas. Although the local intensity of these thunderstorms can be quite high, the precipitation accumulation

is normally small. Annual precipitation for a climate station near the basin is shown on table B-2.

Table B-2. Precipitation Summary 1961 through 1990.

Station	Average Annual Precipitation	Average Monthly Precipitation	Average Monthly Precipitation	Elevation (Mean Sea Level)
Dayton, Washington	47.0 cm [1/] (18.52 in) [2/]	6.1 cm (2.38 in)	1.4 cm (0.54 in)	474.6 meters (1,557 feet)

[1/] Centimeters.
[2/] Inches.

d. Streamflow Characteristics.

In general, the runoff pattern in the Touchet River basin consists of high flows from November through May and low flows from June through October. The spring snowmelt flood period usually extends from about the first of March through the end of May, but peak discharges resulting from snowmelt runoff rarely result in damaging stages. In the past, winter flood peaks in the period December through February have been responsible for most of the flood damage that has occurred in the basin. These runoff events, which tend to be flash-type floods of relatively short duration, are usually caused by either intense rainfall occurring on ground with a high soil moisture content or by warm temperatures and rainfall on snow and frozen ground. The following characteristics are representative of Coppei Creek. The average stream slope of Coppei Creek in the study reach varies from approximately 11.4 meters per kilometer (60 feet per mile) upstream of the U.S. 12 Bridge to approximately 7.6 meters per kilometer (40 feet per mile) downstream of the U.S. 12 Bridge. Coppei Creek's floodwaters may carry significant amount of debris, which cause channel obstructions at bridges and elsewhere.

B1.06. PAST FLOODS.

Although there are no stream gage stations on Coppei Creek, accounts of floods have been obtained from newspaper records, individual accounts, and similar sources. These accounts indicate there were two or three floods from 1960 to 1974 that caused considerable damage in the City of Waitsburg. More recently, in February 1996, a large flood occurred on Coppei Creek. From high-water marks, this flood is estimated to have approximately a 1.4-percent chance of exceedance or a discharge of 48.1 cubic meters per second (cms) [1,700 cubic feet per second (cfs)]. All these floods tended to be floods of short duration and were caused by either intense rainfall occurring on ground with a high soil moisture content or by warm temperatures and rainfall on snow and

frozen ground. Flood photos taken near the time of the peak flooding in February 1996 are shown on photos 1 through 4 in the photo section of this appendix.

B1.07. FLOOD FREQUENCIES.

Since there are no systematic discharge records available for Coppei Creek, discharges were computed for selected probabilities using a regional analysis. The regional analysis used consisted of relating basin characteristics to streamflow characteristics. The discharges and associated recurrence intervals, listed in the table B-3 below, are the same as those published in the Flood Insurance Study, City of Waitsburg, Washington, Walla Walla County, dated May 3, 1982. Chart 1 (see chart section of this appendix) shows the annual peak discharge frequency curve.)

Table B-3. Coppei Creek at Waitsburg, Washington, Summary of Discharges.

Percent Chance Exceedance	Peak Discharge (cms)	Peak Discharge (cfs)
10	21.5	760
2	43.0	1,520
1	56.6	2,000
0.2	103.4	3,650

B1.08. HYDRAULICS.

a. Survey and Map Data.

For this study and the recently published floodplain management special study, 29 valley sections and 5 bridge details with associated bridge cross-sections were surveyed. The location of these cross sections is shown on maps 1 through 4. The cross sections are labeled A through AK in downstream to upstream order. From these cross sections and two additional cross sections surveyed in the vicinity of the fairgrounds (cross sections B OVR and D OVR) several hydraulic models were developed. Floodplains were mapped on a 10-foot contour interval photogrametric map published by the Washington State Highway Department, dated April 1966. All data is presented in the NGVD 29 vertical datum.

b. Hydraulic Models.

The Hydrologic Engineering Center's (HEC) Computer Program entitled *Water Surface Profiles*, Version 4.6.2, commonly referred to as "HEC-2," was used to compute the water surface profiles (plates 1 through 6) for the 10-percent, 2-percent, and 1-percent chance floods for the existing condition. Water surface profiles for the leveed condition and new bridge are shown on plates 8 through 13. The 1-percent chance floodplain and floodway are depicted on maps 1 through 4 for the existing condition while the leveed condition with the

new bridge is shown on maps 5 through 8. Floodway data tables for both conditions are shown in tables 4 and 5, respectively, in the table section of this appendix. Roughness coefficients used for this analysis were estimated based on a site visit and engineering judgment. Manning's "n" values of 0.040 for the channels and 0.035 to 0.045 for the overbanks were used for the study.

(1) Existing Condition Model Description.

The Coppei Creek model for the existing condition is described as follows. This model extends from the confluence of the Touchet River and Coppei Creek to approximately 762 meters (2,500 feet) upstream of Meinburg Road. Starting water surface elevations in the Touchet River are those used in the current flood insurance study.

In the course of the special study, *Floodplain Management Services, Special Study, City of Waitsburg and Walla Walla County, Washington,* dated April 2001, several errors were identified in the *Flood Insurance Study, City of Waitsburg, Walla Walla County Washington,* dated May 3, 1982. First, the U.S. 12 Bridge is not modeled correctly, allowing the entire 1-percent chance flood to pass through the bridge opening or over the roadway. The special study showed that approximately 25 percent of the 1-percent chance exceedance flood would flow north over East Tenth Street and along U.S. 12 and not return to the Coppei Creek channel. Second, the flood insurance study cross sections, downstream of the U.S. 12 Bridge, are not long enough and catch points, in the left and right overbanks, are estimated from computed water surface elevations which exceed the vertical extent of the cross sections by more than 1 foot. Further, the flood insurance study bridge cross sections are not encroached for effective flow. The above-listed discrepancies in the Flood Insurance Study model made it necessary to establish new base flood elevations and new proposed regulatory elevations for the existing condition.

The proposed floodway elevations listed in table B-4 exceed the proposed regulatory elevations by more than 0.31 meters (1 foot) at several cross sections downstream of cross section X. Since both the 1-percent chance exceedance flood and floodway flows are contained in the low-flow channel for the existing condition, the floodway can be considered limited to the channel.

Floodplain limits in the right overbank between cross sections N and S were determined by using 3.5 cms (125 cfs), which leaves the channel between cross sections R and S over a weir. A portion of this flow, approximately 1.8 cms (65 cfs), returns to the Coppei Creek channel just upstream of the Seventh Street Bridge. The remaining 1.7 cms (60 cfs) flows over Seventh Street and continues downstream returning to the channel just upstream of the State Highway 124 Bridge. The flow over Seventh Street and the return flow were determined by weir flow computations. Chart 2 (see chart section of this appendix) shows the flow distributions for various discharges. The

water surface contours shown upstream of Seventh Street in the right overbank were determined by linear interpolation along the right floodplain limit between the energy gradeline at cross section S to the overflow at Seventh Street. In February 1996, flood flows entered and traveled along this elevated channel.

The existing U.S. 12 Bridge is a concrete arch structure that has a limited hydraulic capacity and modeled floods greater than the 10-percent flood will not pass entirely through the bridge. For larger floods, some of the flow would be backed up and flow over East Tenth Street, and a larger amount would flow over U.S. 12 in the right overbank.

Upstream of Meinburg Road, a large right-bank channel exists. This channel is larger and lower than the Coppei Creek low-flow channel. Flood flows entered this channel in February 1996, however, the majority of the flow remained in the low-flow channel upstream of cross section AI. Right bank floodplain limits were established by projecting computed water surface elevations to the right bank of this channel.

Water surface profiles for an overflow area between East Tenth Street and Meinburg Road, in the vicinity of the fairgrounds, were modeled using HEC-2's split flow option. The flood flows that enter this overflow area do not return to the Coppei Creek channel; instead, the discharge flows downstream through the fairgrounds over East Tenth Street and into an area bounded by Coppei Street on the west and Cemetery avenue on the east. Flood flows would then continue overland in a northerly direction and pond between Preston, Coppei, and Main streets. Some of the flow would return to Coppei Creek upstream of East Tenth Street, and the remaining water, which does not reach the ponding area, would flow into the Touchet River. The overland flow, downstream of East Tenth Street, was not modeled and depths were estimated to be 0.61 meter (2 feet) or less. Flood depths were determined using existing topography and engineering judgment. Critical flow is assumed at East Tenth Street and is apparent in February 1996 flood photos. Water surface profiles for the 1-percent and 2-percent chance floods are shown on plate 7. One-percent chance floodplains are shown on maps 2 through 4. Approximately 15 cms (530 cfs) will flow over East Tenth Street during a 1-percent chance flood.

Channel velocities upstream of the U.S. 12 Bridge range from 1.8 to 3.1 meters per second (6 to 10 feet per second), while overbank velocities range from 0.31 to 0.91 meters per second (1 to 3 feet per second).

(2) <u>Leveed Condition with New U.S. 12 Bridge</u>.

This model also extends from the confluence of the Touchet River and Coppei Creek to approximately 762 meters (2,500 feet) upstream of Meinburg Road.

The floodway elevation exceeds the regulatory elevation by more than the allowable 0.31 meter (1 foot) at several cross sections downstream of section Q. Since both 1-percent chance flood and floodway flows are contained in the low-flow channel, the floodway can be considered limited to the channel.

Floodplain limits in the right over-bank between cross sections N and S would be contained by the downstream portion of the levee. In February 1996, flood flows entered and traveled along this elevated channel.

No flow exists in the overflow area between Tenth Street and Meinburg Road as the upstream levee cuts off any flow through this area. This forces the water that would have flowed in this direction through a new larger capacity U.S. 12 Bridge.

Upstream of Meinburg Road, a large right-bank channel exists. This channel is larger and lower than the Coppei Creek low-flow channel. Flood flows entered this channel in February 1996; however, the majority of the flow remained in the low-flow channel upstream of cross section AI. Right bank floodplain limits were established by projecting computed water surface elevations to the right bank of this channel. This represents no change from the existing condition.

Channel velocities upstream of the U.S. 12 Bridge range from1.8 to 3.1 meters per second (6 to 10 feet per second), while overbank velocities range from 0.31 to 0.91 meters per second (1 to 3 feet per second).

(3) <u>The 0.2-Percent Chance Floodplain</u>.

A large portion of the City of Waitsburg is built on an alluvial fan formed by Coppei Creek. For floods as large as the 0.2-percent flood, Coppei Creek may flow in many unpredictable flow paths at high velocities. To determine the 0.2-percent floodplain downstream of Meinburg Road, the Federal Emergency Management Agency's computer program "FAN, An Alluvial Fan Flooding Computer Program," dated September 1990, was used. This program is used to predict flood depth and velocity zones. The FAN program uses the annual peak discharge frequency curve statistics for input. The FAN program input is derived for the 0.2-percent chance flood as follows: The annual peak discharge frequency curve for Coppei Creek is translated horizontally so that the discharge associated with the 0.2-percent chance exceedance probability is relocated and corresponds to the 1-percent chance exceedance discharge. The statistics of the translated frequency curve are then used as input to the FAN program. These depth and velocity zones are depicted on map 9.

B1.09. FLOODPLAIN MANAGEMENT.

It is recommended that Waitsburg, Washington, and Walla Walla County, Washington, use the base flood elevations for floodplain management within the City of Waitsburg, Washington. These base flood elevations may also be used to show compliance with other Federal, state, or county floodplain related regulations. A floodplain map with water surface elevation contours and floodway is shown on maps 1 through 8. Maps 1 through 4 represent the existing condition and maps 5 through 8 are for the proposed project. Note that the leveed condition with the new bridge does not increase the surcharge more than 0.31 meter (1 foot) over the existing condition or flows would be contained in the channel, nor do any of the proposed levees or structures encroach on the floodway. Note also the floodway is narrower in the vicinity of the U.S. 12 Bridge than it is as shown on maps 3 and 4. This is because the 1-percent chance flow would flow through the bridge.

APPENDIX B

HYDROLOGY

SPECIAL TABLE SECTION

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	FLOODWAY	INCREASE[2] (FEET)
A	397	70	301	6.6	1222.0	1222.0	1223.0	1.0
B	986	73	243	8.2	1224.7	1224.7	1225.9	1.2
C	1986	52	260	7.7	1230.3	1230.3	1231.6	1.3
D	2478	50	286	7.0	1232.4	1232.4	1233.9	1.5
E	2620	89	301	6.6	1233.1	1233.1	1234.6	1.5
F	2652	89	330	6.1	1233.6	1233.6	1235.0	1.4
G	2751	50	292	6.9	1234.0	1234.0	1235.2	1.2
H	3190	44	269	7.4	1235.6	1235.6	1237.0	1.4
I	3828	51	306	6.5	1237.7	1237.7	1239.4	1.7
J	4731	57	270	7.4	1240.5	1240.5	1242.3	1.8
K	5288	54	279	7.2	1242.7	1242.7	1244.5	1.8
L	5369	55	322	6.2	1243.2	1243.2	1245.0	1.8
M	5398	55	333	6.0	1243.4	1243.4	1245.2	1.8
N	5434	54	309	6.5	1243.5	1243.5	1245.2	1.7
O	5715	64	277	7.2	1244.4	1244.4	1246.1	1.7
P	6074	63	292	6.9	1245.9	1245.9	1247.6	1.7
Q	6636	65	611	3.3	1246.9	1246.9	1248.7	1.8
R	8141	80	199	10.1	1256.3	1256.3	1257.2	0.9
S	8676	112	348	5.8	1261.8	1261.8	1262.7	0.9
T	9451	41	166	12.0	1268.0	1268.0	1269.0	1.0
U	9467	41	225	8.9	1269.3	1269.3	1270.4	1.1
V	9906	142	452	4.4	1272.6	1272.6	1273.4	0.8
W	10313	124	230	8.7	1275.8	1275.8	1276.4	0.6

[1] Distance in feet from confluence with Touchet River

[2] At cross sections that show increases greater than 1.0 feet, the one-precent chance discharge flood and floodway are contained in Coppei Creek's channel banks.

TABLE 4

U. S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

WAITSBURG & WALLA WALLA COUNTY, WASHINGTON

(INCORPORATED AND UNINCORPORATED AREAS)

FLOODWAY DATA

A00707

COPPEI CREEK

SHEET 1 OF 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	FLOODWAY	INCREASE[2] (FEET)
X	10439	67	244	8.2	1277.5	1277.5	1278.0	0.5
Y	10473	146	864	2.3	1281.8	1281.8	1282.8	1.0
Z	10538	135	785	2.5	1281.9	1281.9	1282.8	0.9
AA	10641	155	816	2.4	1281.9	1281.9	1282.9	1.0
AB	11121	59	201	9.9	1281.9	1281.9	1282.6	0.7
AC	11391	162	361	5.5	1285.6	1285.6	1286.2	0.6
AD	11742	196	410	4.9	1287.8	1287.8	1288.4	0.6
AE	12056	296	383	5.2	1291.4	1291.4	1291.4	0.0
AF	12124	329	384	5.2	1294.1	1294.1	1294.0	0.0
AG	12136	329	542	3.7	1294.7	1294.7	1294.7	0.0
AH	12218	370	1067	1.9	1295.1	1295.1	1295.1	0.0
AI	12650	356	569	3.5	1295.5	1295.5	1295.6	0.1
AJ	13574	280	339	5.9	1304.2	1304.2	1304.2	0.0
AK	14705	233	272	7.4	1315.8	1315.8	1315.8	0.0

1 Distance in feet from confluence with Touchet River

2 At cross sections that show increases greater than 1.0 feet, the one-precent chance discharge flood and floodway are contained in Coppei Creek's channel banks.

TABLE 4

U. S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

WAITSBURG & WALLA WALLA COUNTY, WASHINGTON

(INCORPORATED AND UNINCORPORATED AREAS)

FLOODWAY DATA

A00707

COPPEI CREEK

SHEET 2 OF 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	FLOODWAY	INCREASE[2] (FEET)
A	397	70	301	6.6	1222.0	1222.0	1223.0	1.0
B	986	73	243	8.2	1224.7	1225.9	1225.9	1.3
C	1986	52	259	7.7	1230.3	1231.6	1231.6	1.4
D	2478	50	286	7.0	1232.4	1233.9	1233.9	1.5
E	2620	89	301	6.6	1233.1	1234.6	1234.6	1.5
F	2652	89	330	6.1	1233.6	1235.0	1235.0	1.4
G	2751	50	292	6.8	1234.0	1235.2	1235.2	1.2
H	3190	44	269	7.4	1235.6	1237.0	1237.0	1.4
I	3828	51	306	6.5	1237.7	1239.4	1239.4	1.7
J	4731	57	270	7.4	1240.5	1242.3	1242.3	1.8
K	5288	54	279	7.2	1242.7	1244.5	1244.5	1.8
L	5369	55	322	6.2	1243.2	1245.0	1245.0	1.8
M	5398	55	333	6.0	1243.4	1245.2	1245.2	1.8
N	5434	54	309	6.5	1243.5	1245.2	1245.2	1.7
O	5715	64	277	7.2	1244.4	1246.1	1246.1	1.7
P	6074	63	292	6.8	1245.9	1247.0	1247.6	1.7
Q	6636	65	611	3.3	1246.9	1247.8	1248.7	1.8
R	8141	80	199	10.1	1256.3	1256.5	1257.2	0.9
S	8676	112	348	5.7	1261.8	1262.3	1262.7	1.1
T	9451	41	166	12.0	1268.0	1269.0	1269.0	1.0
U	9467	41	225	8.9	1269.3	1270.4	1270.4	1.1
V	9906	142	452	4.4	1272.6	1273.4	1273.4	0.8
W	10313	123	230	8.7	1275.8	1276.4	1276.4	0.6

[1] Distance in feet from confluence with Touchet River

[2] At cross sections that show increases greater than 1.0 feet, the one-precent chance discharge flood and floodway are contained in Coppei Creek's channel banks.

U. S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

WAITSBURG & WALLA WALLA COUNTY, WASHINGTON

(INCORPORATED AND UNINCORPORATED AREAS)

TABLE 5

FLOODWAY DATA

A00708

COPPEI CREEK (WITH PROJECT)

SHEET 1 OF 2

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY (FEET NGVD)	FLOODWAY	INCREASE[2] (FEET)
X	10439	50	254	7.9	1277.5	1277.9	1277.9	0.4
Y	10473	50	272	7.4	1281.8	1278.3	1278.3	0.0
Z	10538	64	185	10.8	1281.9	1278.2	1278.2	0.0
AA	10641	155	453	4.4	1281.9	1280.5	1280.5	0.0
AB	11121	59	207	9.7	1281.9	1282.7	1282.7	0.8
AC	11391	162	355	5.6	1285.6	1286.2	1286.2	0.6
AD	11742	196	413	4.8	1287.8	1288.6	1288.4	0.6
AE	12056	296	368	5.4	1291.4	1291.4	1291.3	0.0
AF	12124	329	390	5.1	1294.1	1294.0	1294.1	0.0
AG	12136	329	540	3.7	1294.7	1294.7	1294.7	0.0
AH	12218	370	1065	1.9	1295.1	1295.1	1295.0	0.0
AI	12650	356	568	3.5	1295.5	1295.5	1295.6	0.1
AJ	13574	280	339	5.9	1304.2	1304.2	1304.2	0.0
AK	14705	233	271	7.4	1315.8	1315.8	1315.8	0.0

[1] Distance in feet from confluence with Touchet River

[2] At cross sections that show increases greater than 1.0 feet, the one-precent chance discharge flood and floodway are contained in Coppei Creek's channel banks.

TABLE 5

U. S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

WAITSBURG & WALLA WALLA COUNTY, WASHINGTON

(INCORPORATED AND UNINCORPORATED AREAS)

FLOODWAY DATA

A00708

COPPEI CREEK (WITH PROJECT)

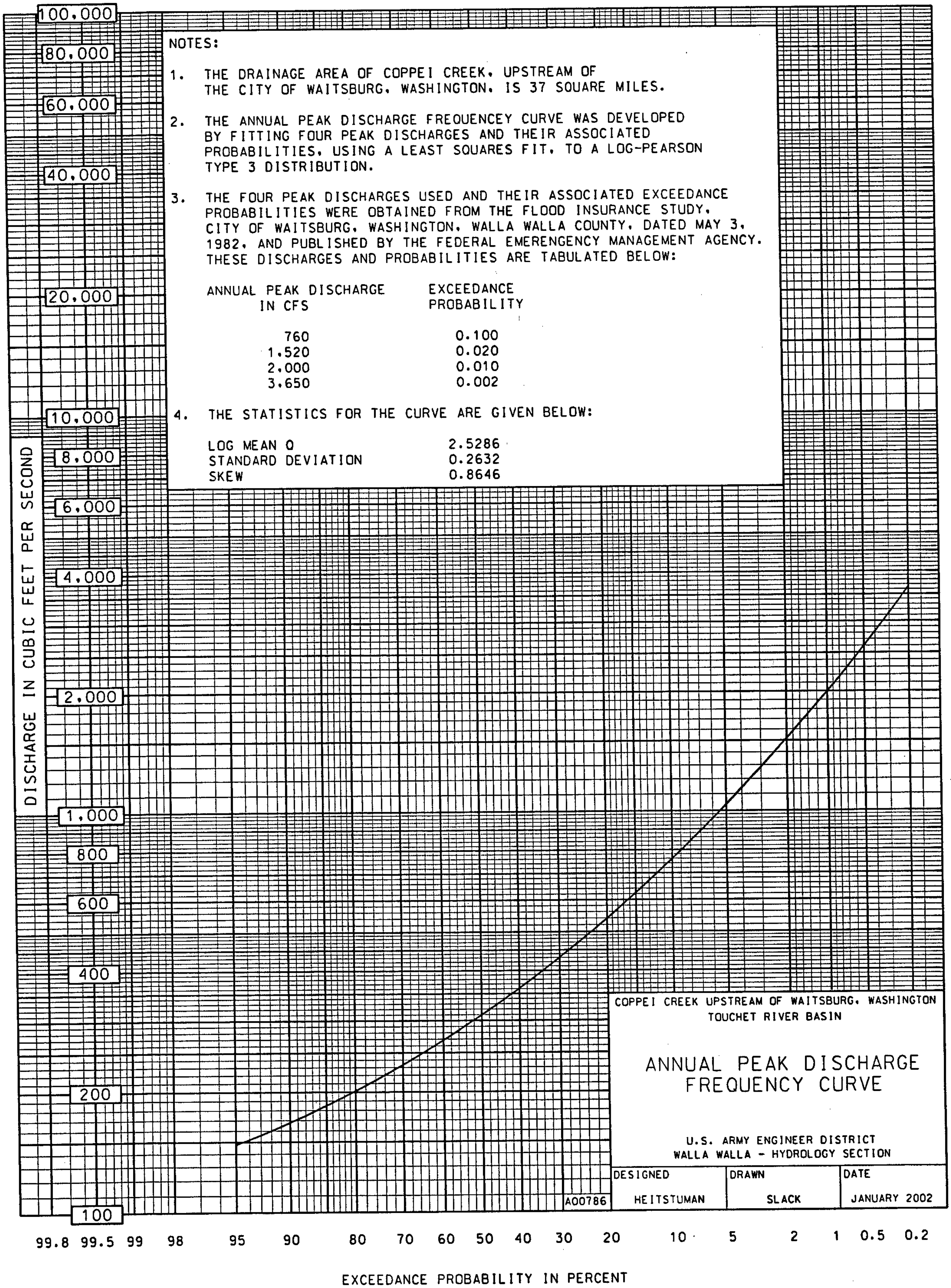
SHEET 2 OF 2

APPENDIX B

HYDROLOGY

CHARTS

Chart 1 – Annual Peak Discharge Frequency Curve
Chart 2 – Rating Curve, Split Flow Return Distribution Vicinity of Seventh Street Bridge



NOTES:

1. THE DRAINAGE AREA OF COPPEI CREEK, UPSTREAM OF THE CITY OF WAITSBURG, WASHINGTON, IS 37 SQUARE MILES.

2. THE ANNUAL PEAK DISCHARGE FREQUENCEY CURVE WAS DEVELOPED BY FITTING FOUR PEAK DISCHARGES AND THEIR ASSOCIATED PROBABILITIES, USING A LEAST SQUARES FIT, TO A LOG-PEARSON TYPE 3 DISTRIBUTION.

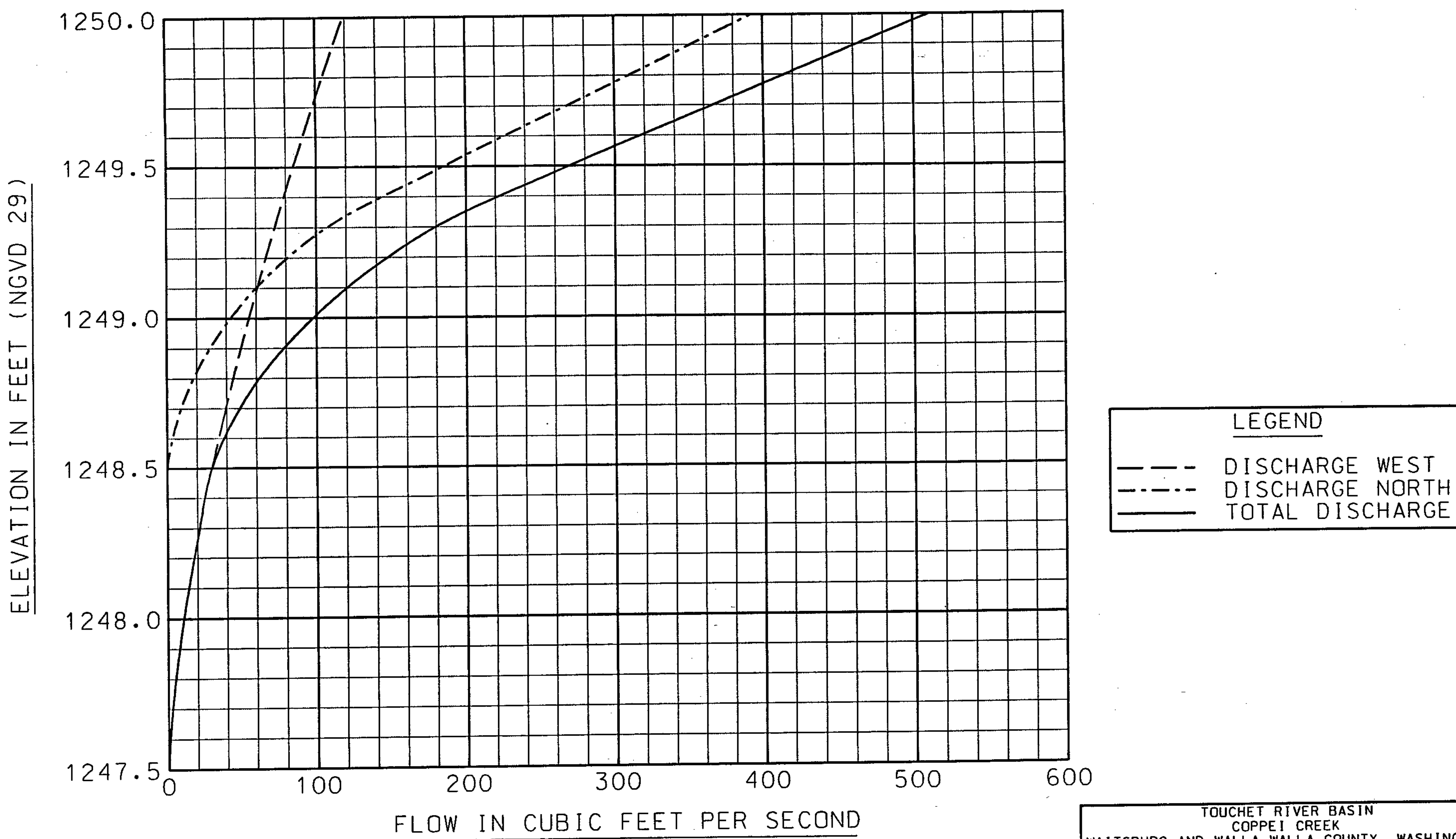
3. THE FOUR PEAK DISCHARGES USED AND THEIR ASSOCIATED EXCEEDANCE PROBABILITIES WERE OBTAINED FROM THE FLOOD INSURANCE STUDY, CITY OF WAITSBURG, WASHINGTON, WALLA WALLA COUNTY, DATED MAY 3, 1982, AND PUBLISHED BY THE FEDERAL EMERENGENCY MANAGEMENT AGENCY. THESE DISCHARGES AND PROBABILITIES ARE TABULATED BELOW:

ANNUAL PEAK DISCHARGE IN CFS	EXCEEDANCE PROBABILITY
760	0.100
1,520	0.020
2,000	0.010
3,650	0.002

4. THE STATISTICS FOR THE CURVE ARE GIVEN BELOW:

LOG MEAN Q	2.5286
STANDARD DEVIATION	0.2632
SKEW	0.8646

CHART 1



TOUCHET RIVER BASIN COPPEI CREEK WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON RATING CURVE SPLIT FLOW RETURN DISTRIBUTION VICINITY OF THE SEVENTH STREET BRIDGE U.S. ARMY ENGINEER DISTRICT WALLA WALLA - HYDROLOGY SECTION		
DESIGNED HEITSTUMAN	DRAWN SLACK	DATE MARCH 2001

A00709

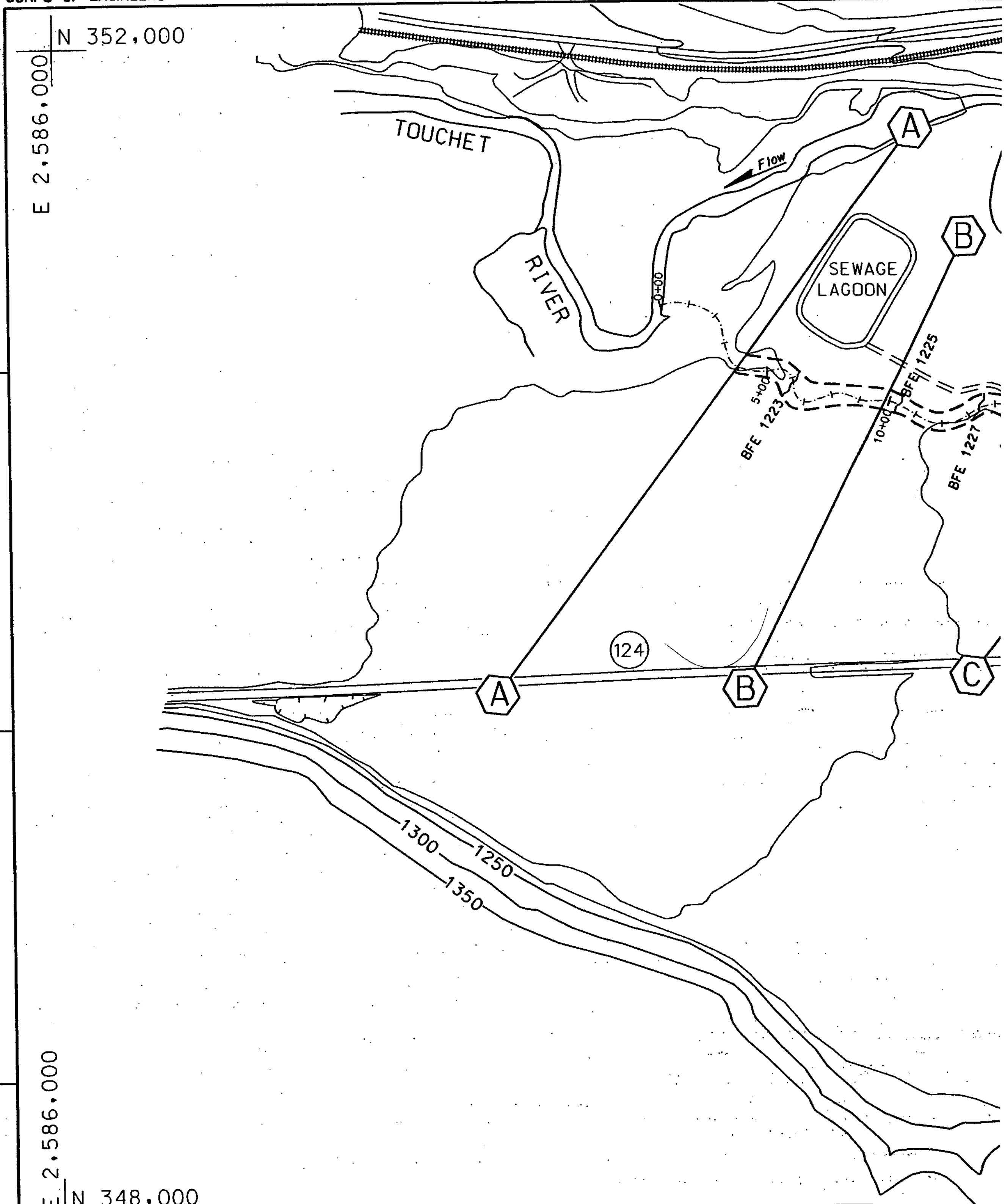
CHART 2

APPENDIX B

HYDROLOGY

MAPS

CORPS OF ENGINEERS



NOTES:

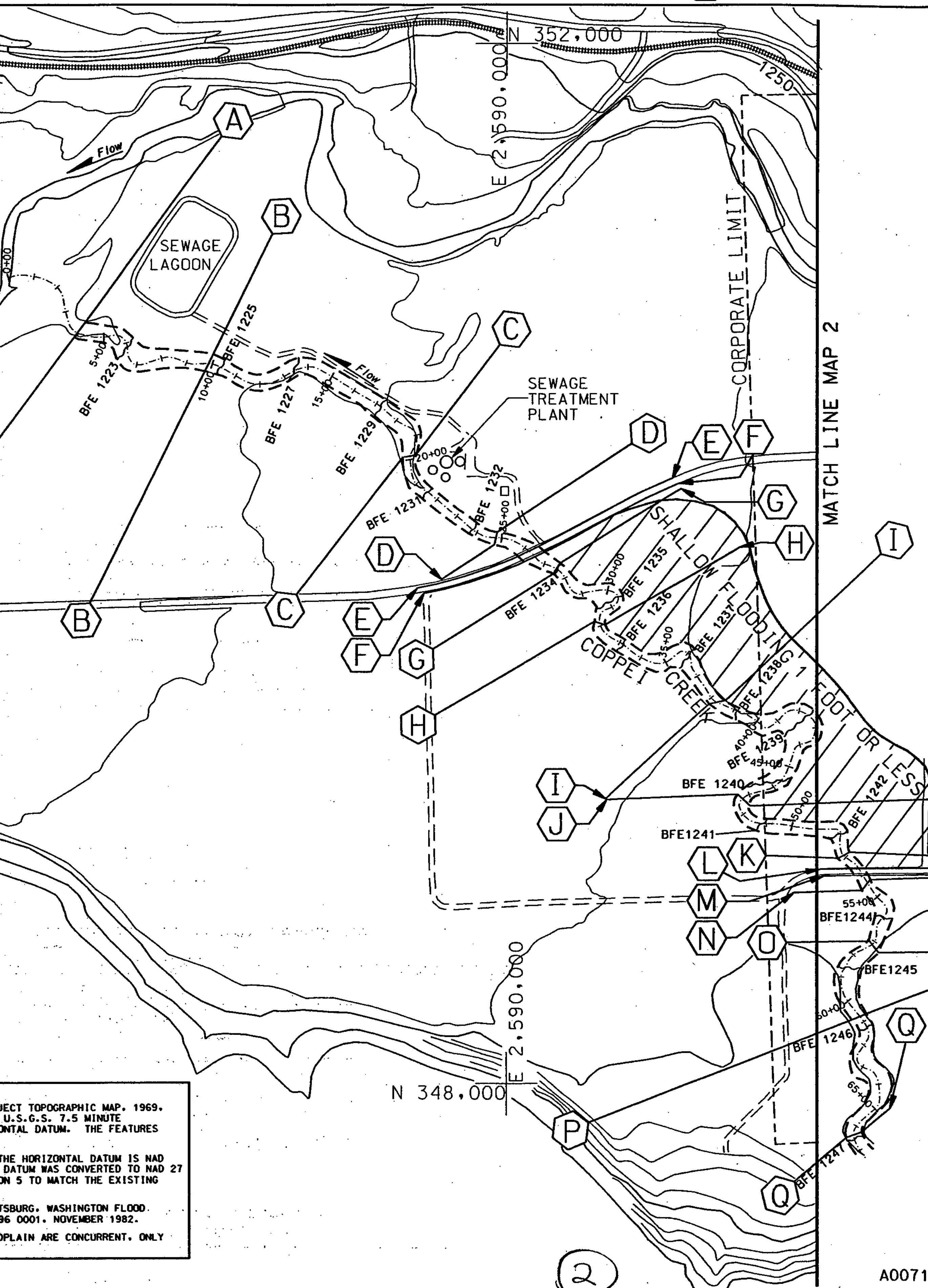
1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.

2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICAL DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.

3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.

4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE FLOODWAY BOUNDARY WILL BE SHOWN.

1



JECT TOPOGRAPHIC MAP. 1969.
U.S.G.S. 7.5 MINUTE
ONTAL DATUM. THE FEATURES

THE HORIZONTAL DATUM IS NAD
DATUM WAS CONVERTED TO NAD 27
ON 5 TO MATCH THE EXISTING

TSBURG. WASHINGTON FLOOD
96 0001. NOVEMBER 1982.

OPLAIN ARE CONCURRENT. ONLY

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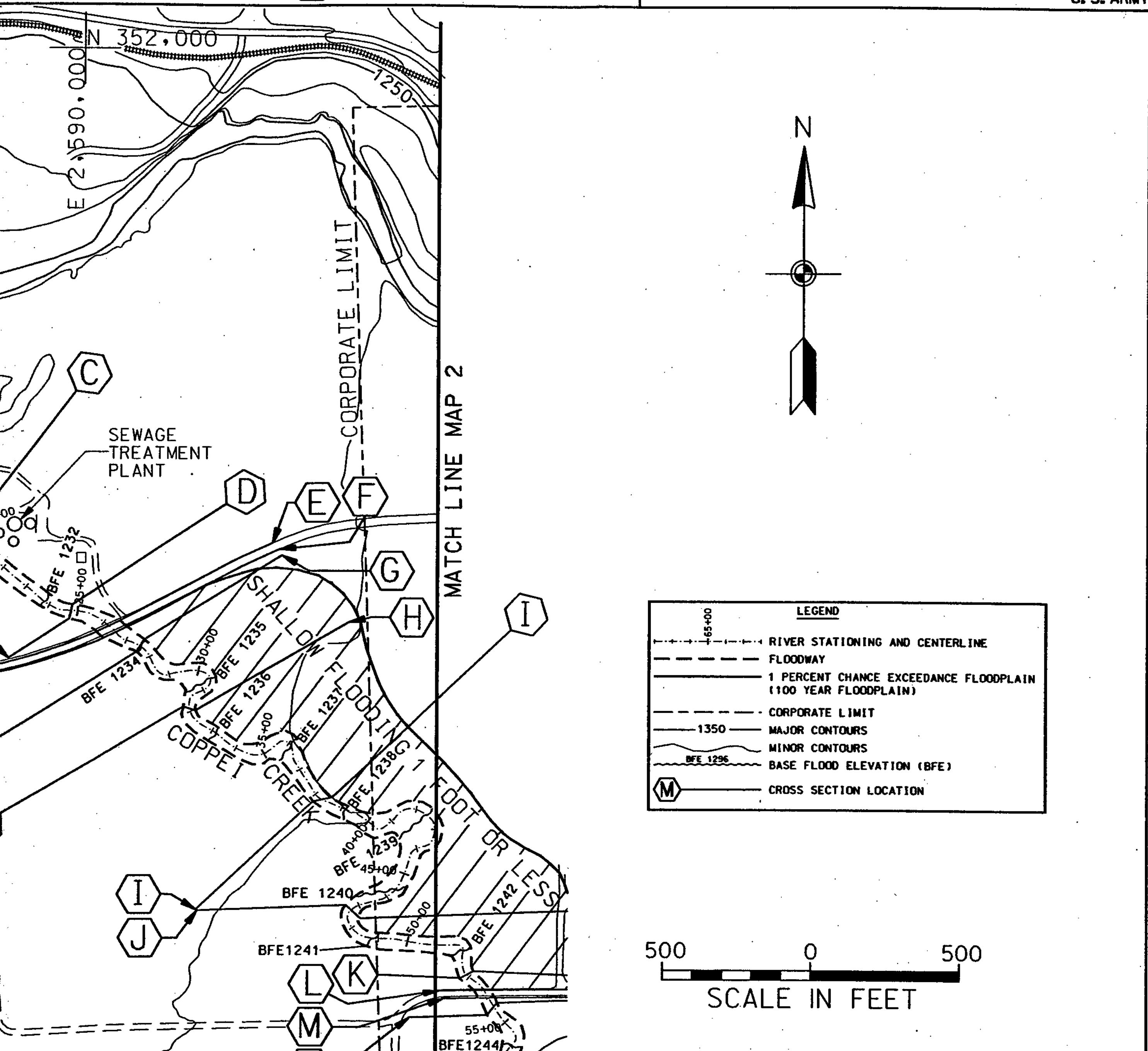


REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED PERCENT CHANCE EXCEEDANCE TO NOTE 4 AND TO 100-YEAR IN LEGEND. REMOVED 500-YEAR LINE TYPE FROM LEGEND	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKER	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

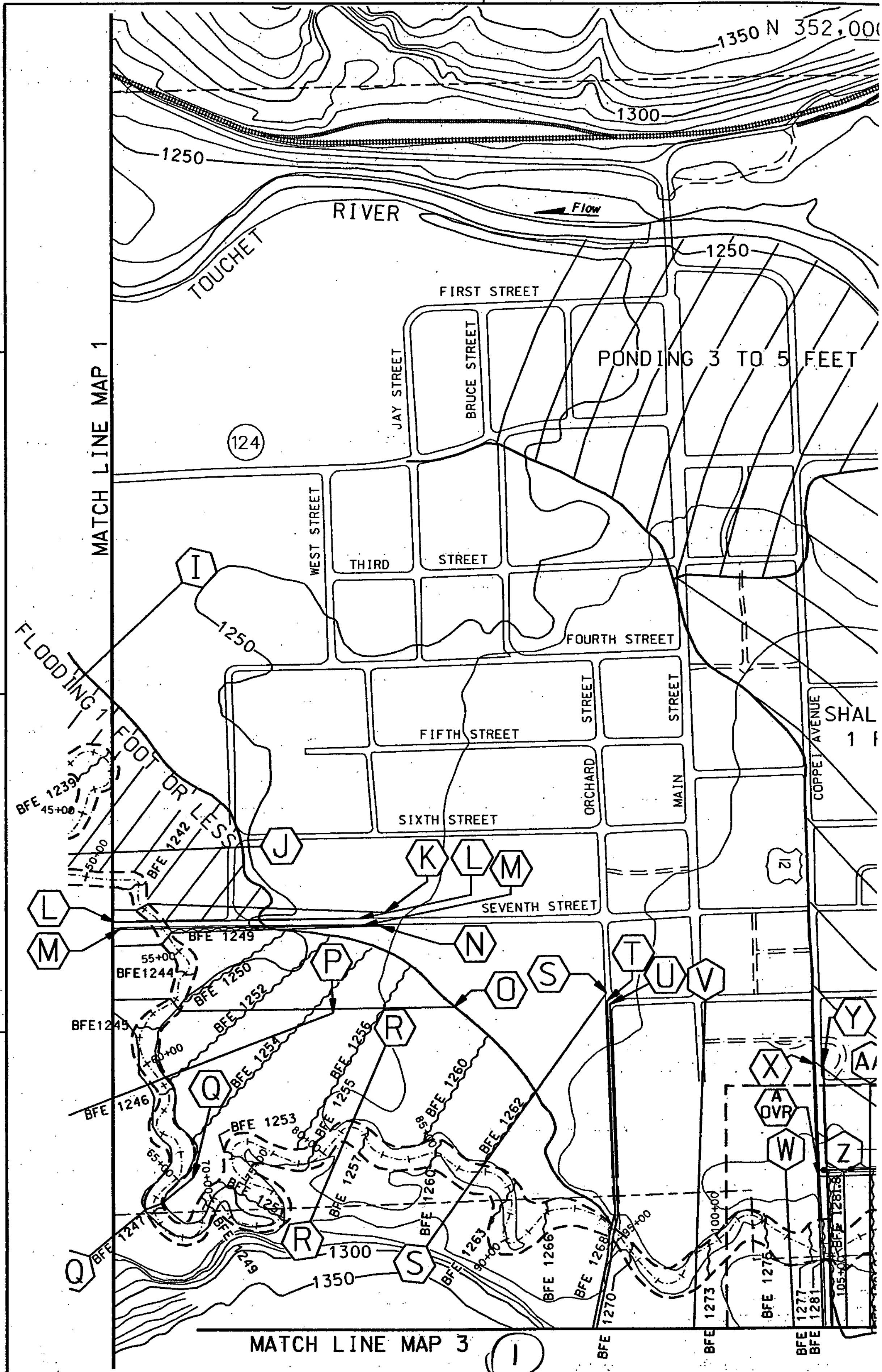
FLOODWAY AND FLOODPLAIN BOUNDARIES

3

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

CORPS OF ENGINEERS



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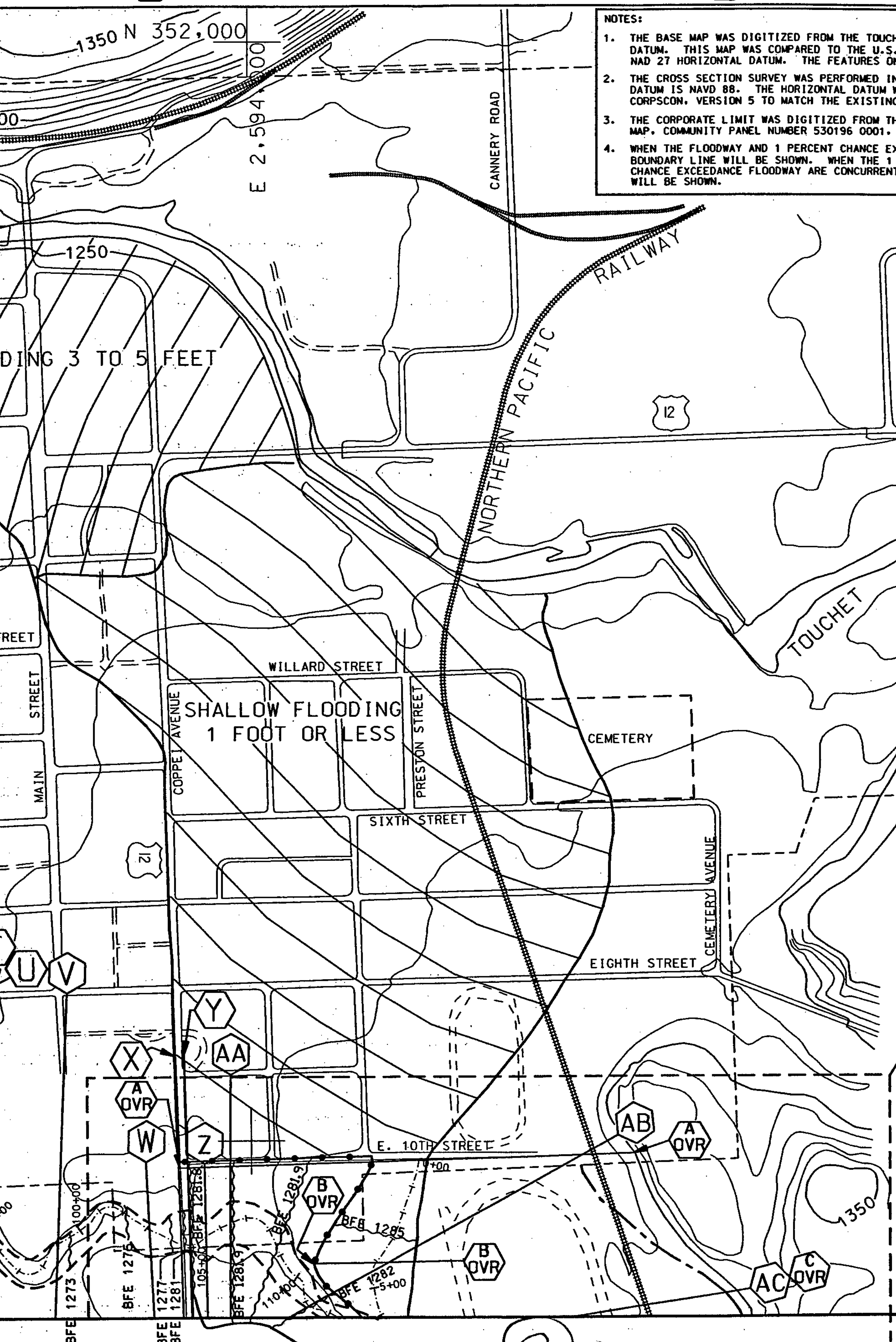

NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MA DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WA NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATU DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE V CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRE BOUNDARY LINE WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOOPL CHANCE EXCEEDANCE FLOODWAY ARE CONCURRENT, ONLY THE 1 PERCENT CHANCE EXCE WILL BE SHOWN.

B	JAN 9, :
A	DECEMBER
REVISION	DATE

WAITSBURG

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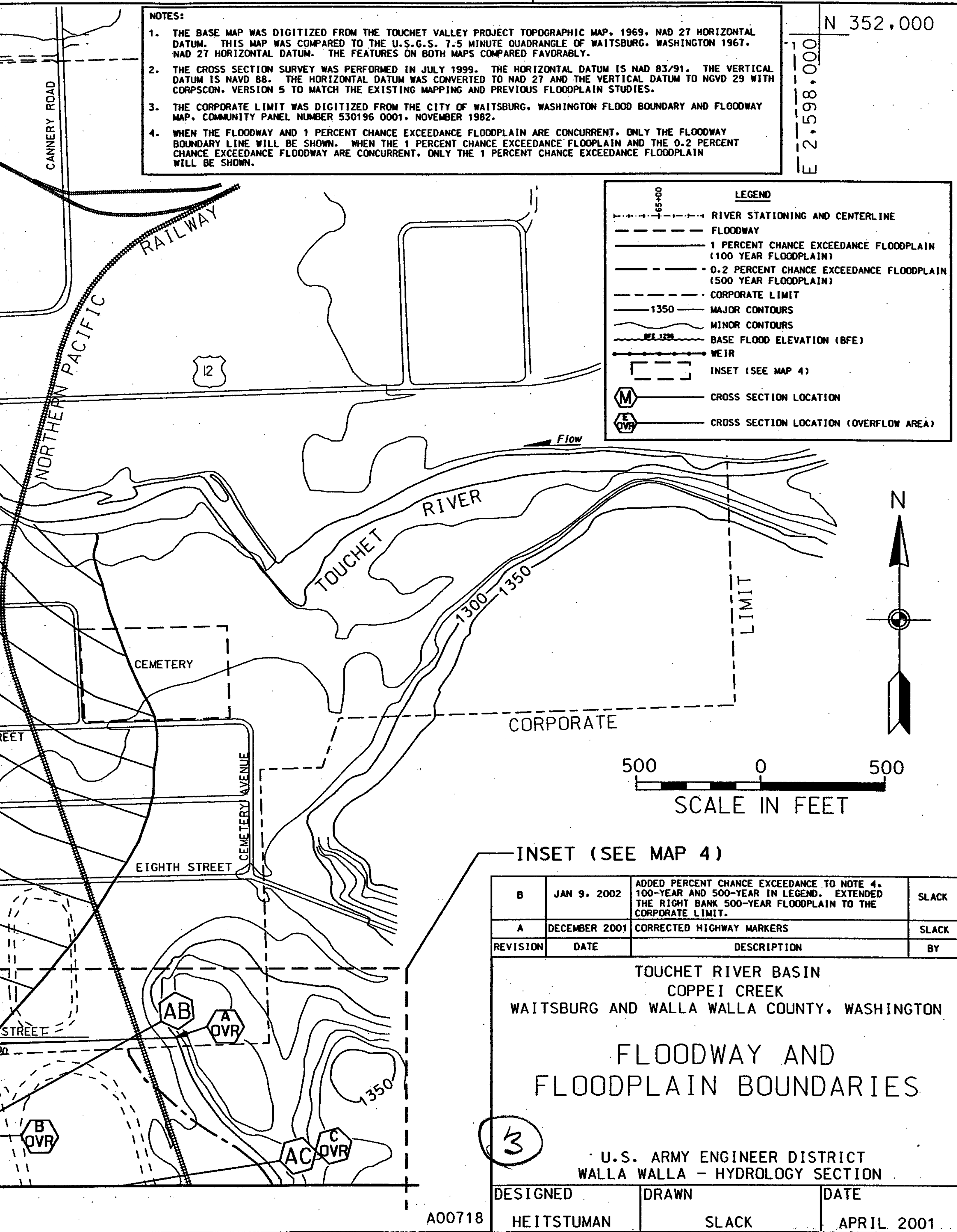
U. S. ARMY



NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICAL DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE FLOODWAY BOUNDARY LINE WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN AND THE 0.2 PERCENT CHANCE EXCEEDANCE FLOODWAY ARE CONCURRENT, ONLY THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN WILL BE SHOWN.

LEGEND

65+00 RIVER STATIONING AND CENTERLINE
FLOODWAY
1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (100 YEAR FLOODPLAIN)
0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500 YEAR FLOODPLAIN)
CORPORATE LIMIT
1350 MAJOR CONTOURS
MINOR CONTOURS
BFE 1356 BASE FLOOD ELEVATION (BFE)
WEIR
INSET (SEE MAP 4)
M CROSS SECTION LOCATION
E OVR CROSS SECTION LOCATION (OVERFLOW AREA)

REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED PERCENT CHANCE EXCEEDANCE TO NOTE 4. 100-YEAR AND 500-YEAR IN LEGEND. EXTENDED THE RIGHT BANK 500-YEAR FLOODPLAIN TO THE CORPORATE LIMIT.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKERS	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

FLOODWAY AND FLOODPLAIN BOUNDARIES

3

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

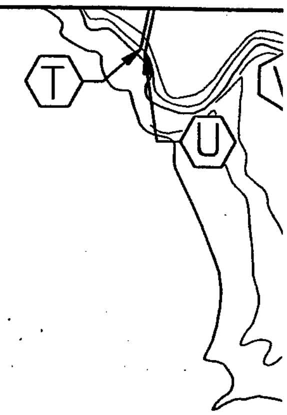
DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

A00718

N 348,000

E 2,590,000

MATCH LINE MAP 2



LEGEND

65+00 RIVER STATIONING AND CENTERLINE

FLOODWAY

1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (100 YEAR FLOODPLAIN)

0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500 YEAR FLOODPLAIN)

1350 MAJOR CONTOURS

MINOR CONTOURS

BFE 1295 BASE FLOOD ELEVATION (BFE)

WEIR

INSET (SEE MAP 4)

M CROSS SECTION LOCATION

E OVR CROSS SECTION LOCATION (OVERFLOW AREA)

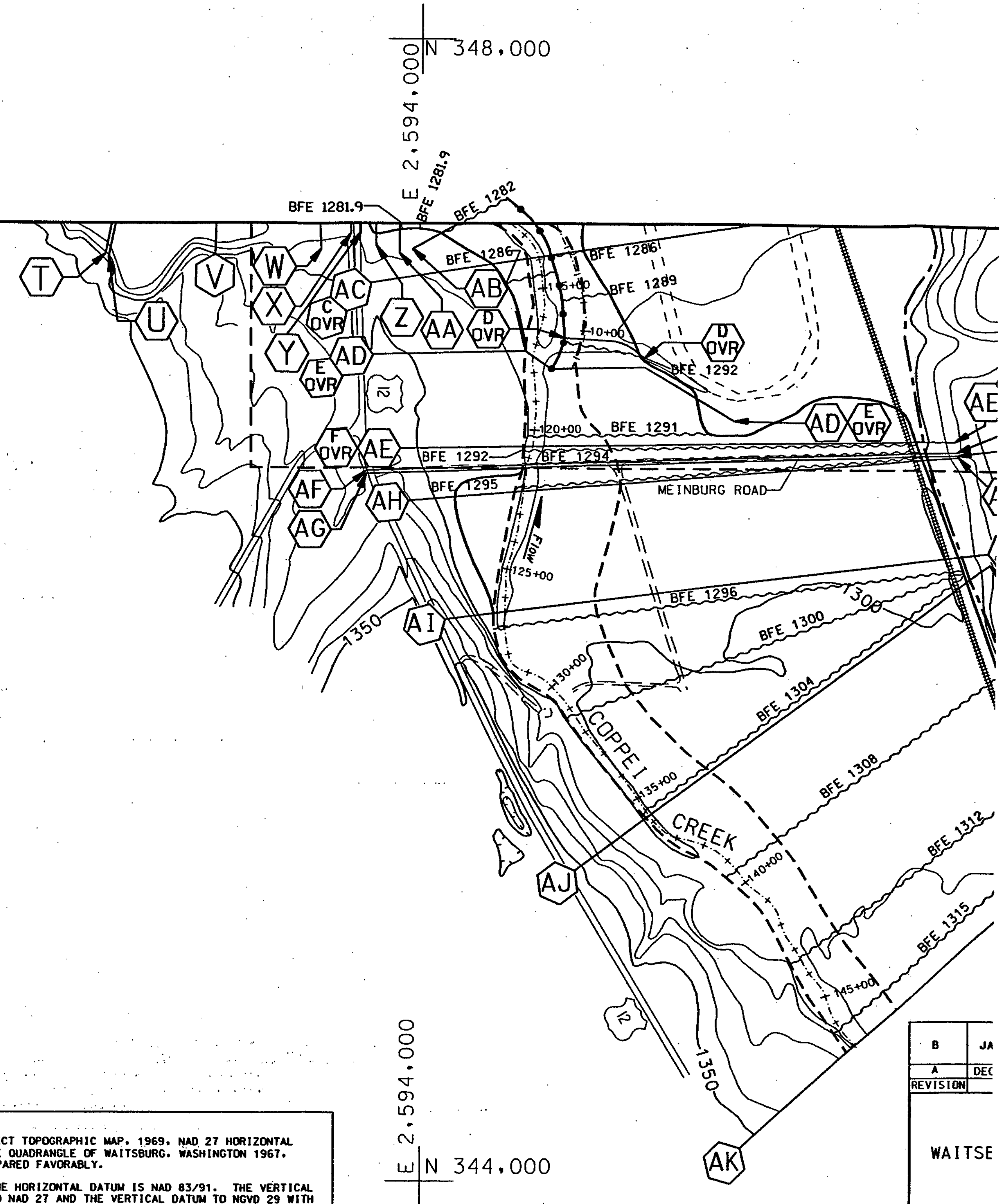
E 2,590,000

N 344,000

NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 2 DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHI NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91 DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE F BOUNDARY WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN AND 0.2 PERCEN EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN W
5. 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500-YEAR FLOODPLAIN) BOUNDARIES ARE TERMINATE OF THE ALLUVIAL FAN. SEE MAP 9.

1



CENTERLINE

EEDANCE FLOODPLAIN
)

XCEEDANCE FLOODPLAIN
)

(BFE)

ON

ON (OVERFLOW AREA)

E TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969. NAD 27 HORIZONTAL
HE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967.
URES ON BOTH MAPS COMPARED FAVORABLY.

RMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICAL
DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH
XISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.

FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY
0001, NOVEMBER 1982.

ANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT. ONLY THE FLOODWAY
1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN AND 0.2 PERCENT CHANCE
NT. ONLY THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN WILL BE SHOWN.

OPLAIN (500-YEAR FLOODPLAIN) BOUNDARIES ARE TERMINATED AT THE EXTENTS

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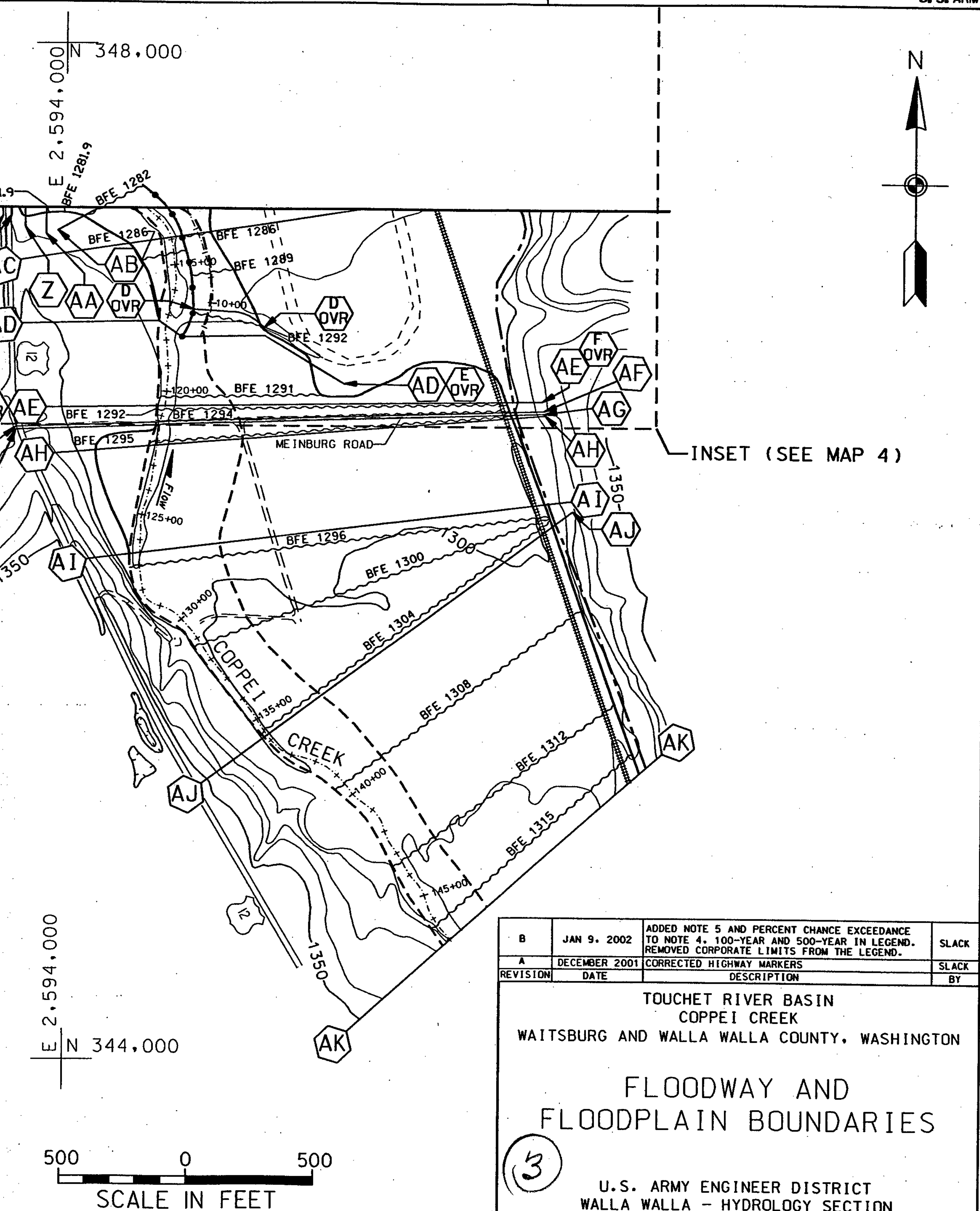


REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED NOTE 5 AND PERCENT CHANCE EXCEEDANCE TO NOTE 4. 100-YEAR AND 500-YEAR IN LEGEND. REMOVED CORPORATE LIMITS FROM THE LEGEND.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKERS	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

FLOODWAY AND FLOODPLAIN BOUNDARIES

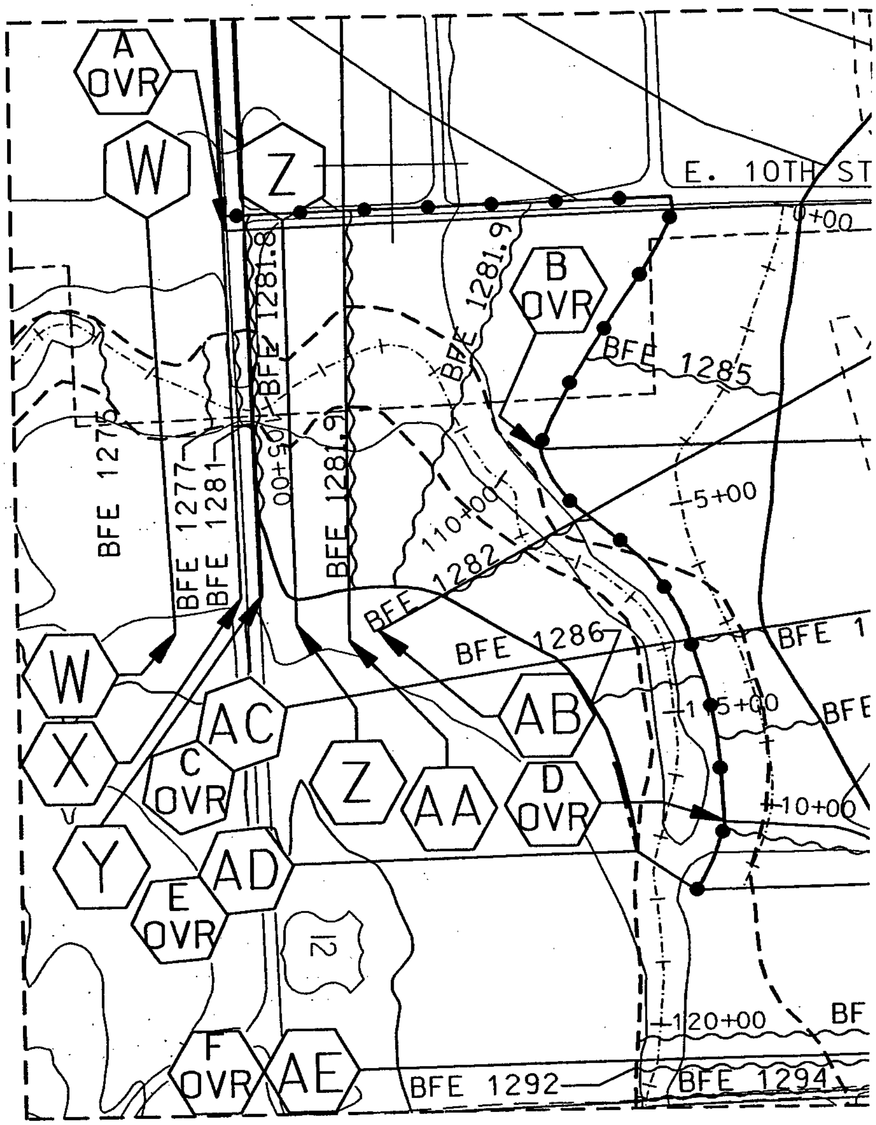
3

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

A00719

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

CORPS OF ENGINEERS



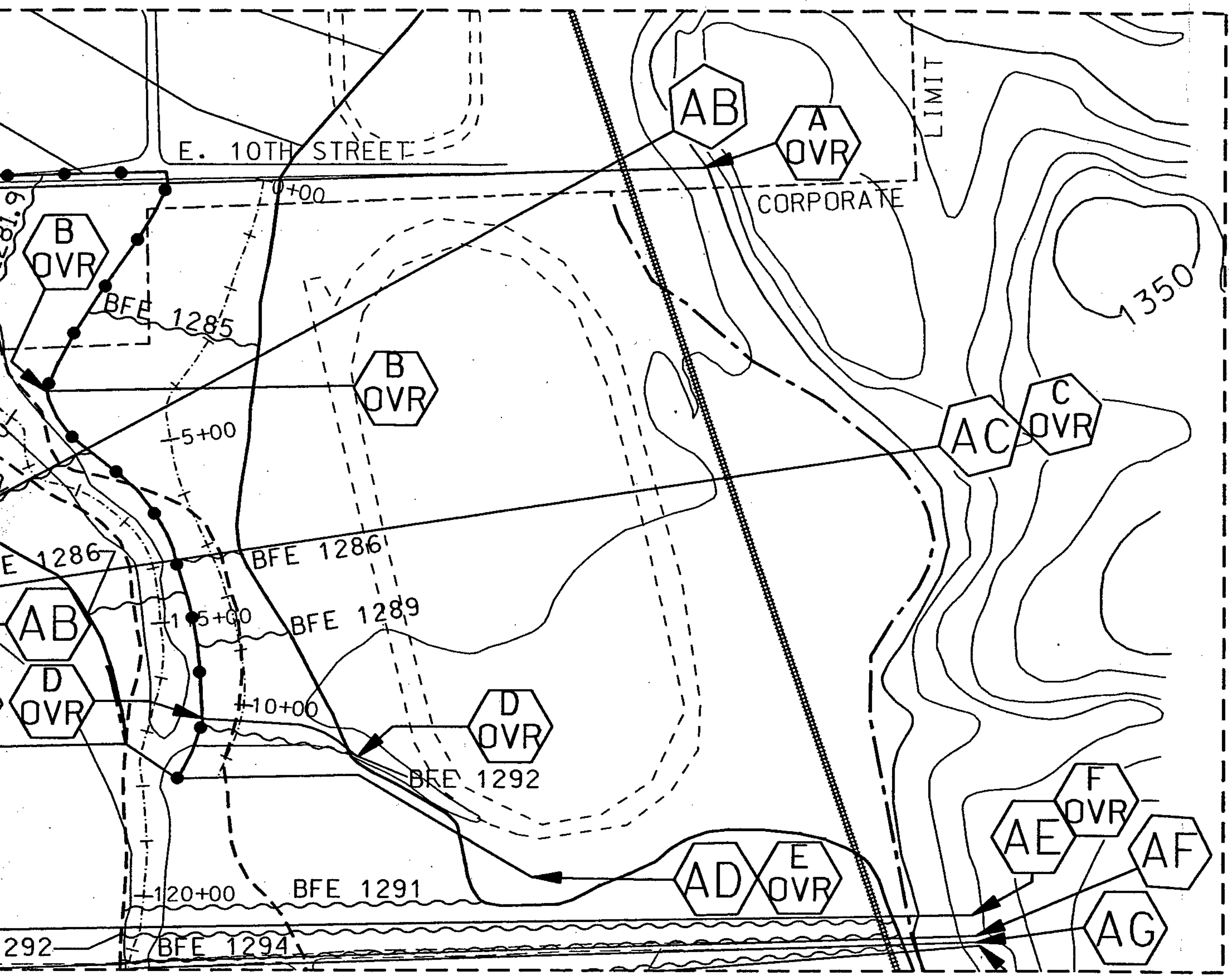
LEGEND

- 65+00 — RIVER STATIONING AND CENTERLINE
- FLOODWAY
- 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (100 YEAR FLOODPLAIN)
- 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500 YEAR FLOODPLAIN)
- CORPORATE LIMIT
- 1350 — MAJOR CONTOURS
- MINOR CONTOURS
- BFE 1296 — BASE FLOOD ELEVATION (BFE)
- WEIR
- INSET (SEE MAP 4)
- M — CROSS SECTION LOCATION
- E OVR — CROSS SECTION LOCATION (OVERFLOW AREA)

NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY P DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MI NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTE CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AN
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF W MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 19
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FL BOUNDARY WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE E EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE 1 PER
5. 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500-YEAR F EXTENTS OF THE ALLUVIAL FAN. SEE MAP 9.

1



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B	JAN 9. 200
A	DECEMBER 20
REVISION	DATE

WAITSBURG A

F

FLOOD

U.S.

WALLA W

DESIGNED

HEITSTUMAN

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(2)

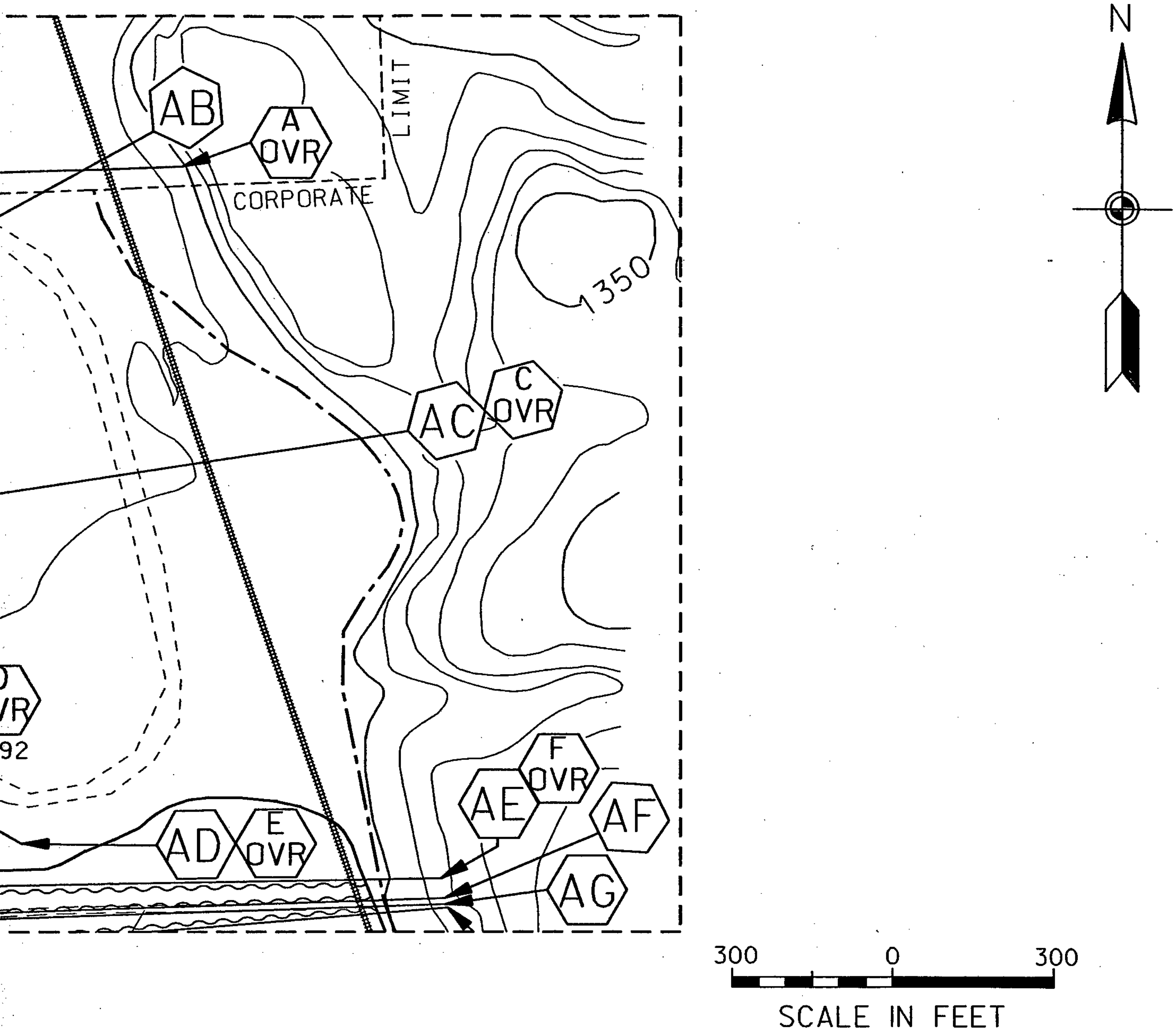
WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP. 1969. NAD 27 HORIZONTAL MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG. WASHINGTON 1967. ONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.

CTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICAL D 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH RSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.

E LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG. WASHINGTON FLOOD BOUNDARY AND FLOODWAY TY PANEL NUMBER 530196 0001. NOVEMBER 1982.

DWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT. ONLY THE FLOODWAY L BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN AND 0.2 PERCENT CHANCE LOODPLAIN ARE CONCURRENT. ONLY THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN WILL BE SHOWN.

CHANCE EXCEEDANCE FLOODPLAIN (500-YEAR FLOODPLAIN) BOUNDARIES ARE TERMINATED AT THE E ALLUVIAL FAN. SEE MAP 9.



1969. NAD 27 HORIZONTAL
BURG. WASHINGTON 1967.

S NAD 83/91. THE VERTICAL
ICAL DATUM TO NGVD 29 WITH
UDIES.

OD BOUNDARY AND FLOODWAY

ONLY THE FLOODWAY
0.2 PERCENT CHANCE
LOODPLAIN WILL BE SHOWN.

E TERMINATED AT THE

REVISION	DATE	DESCRIPTION	BY
B	JAN 9. 2002	ADDED NOTE 5 AND ADDED PERCENT CHANCE EXCEEDANCE TO NOTE 4. 100-YEAR AND 500-YEAR IN THE LEGEND. EXTENDED RIGHT BANK 500-YEAR LINE TO CORPORATE LIMIT.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKER	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

FLOODWAY AND FLOODPLAIN BOUNDARIES

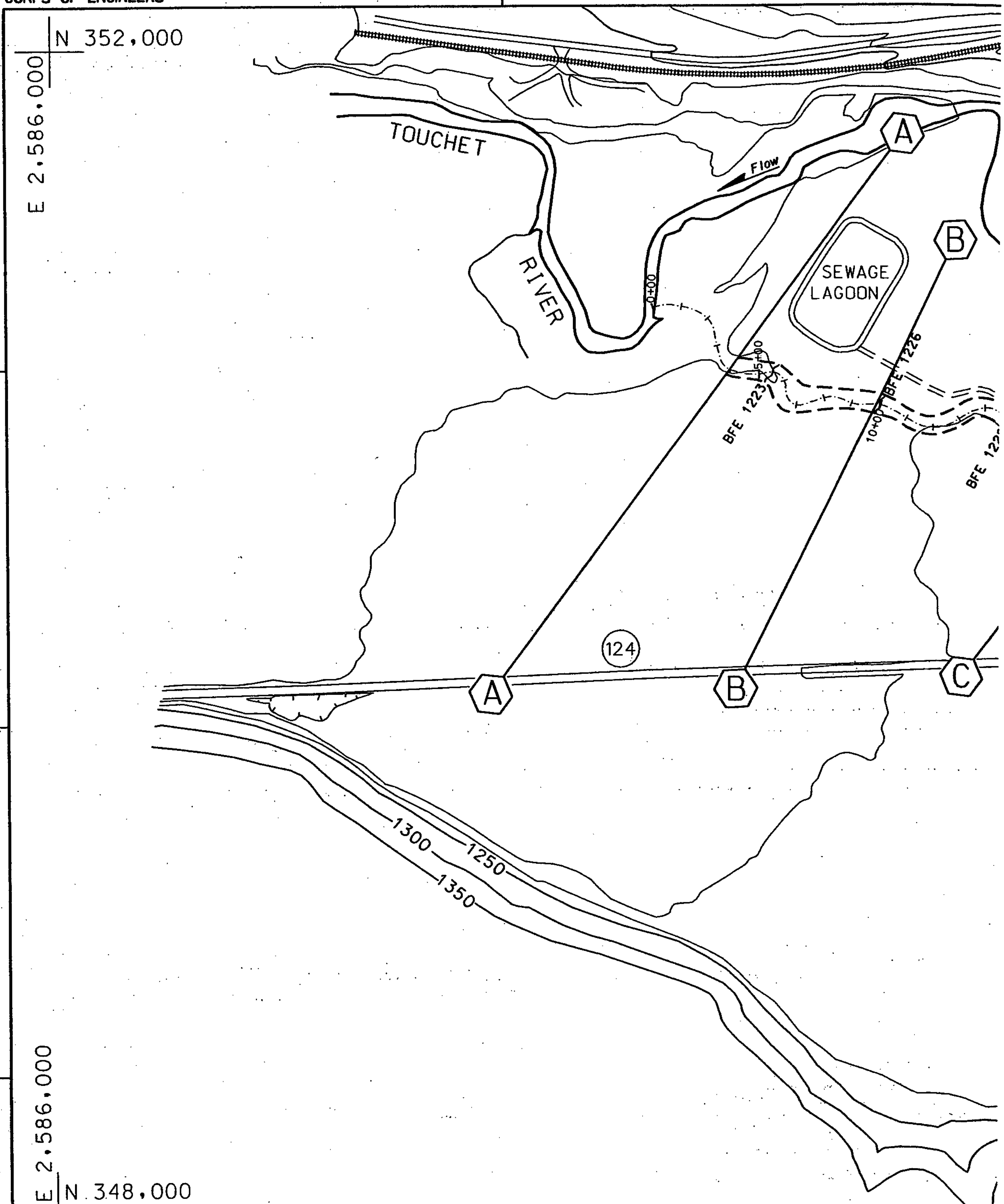
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

3

A00720

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

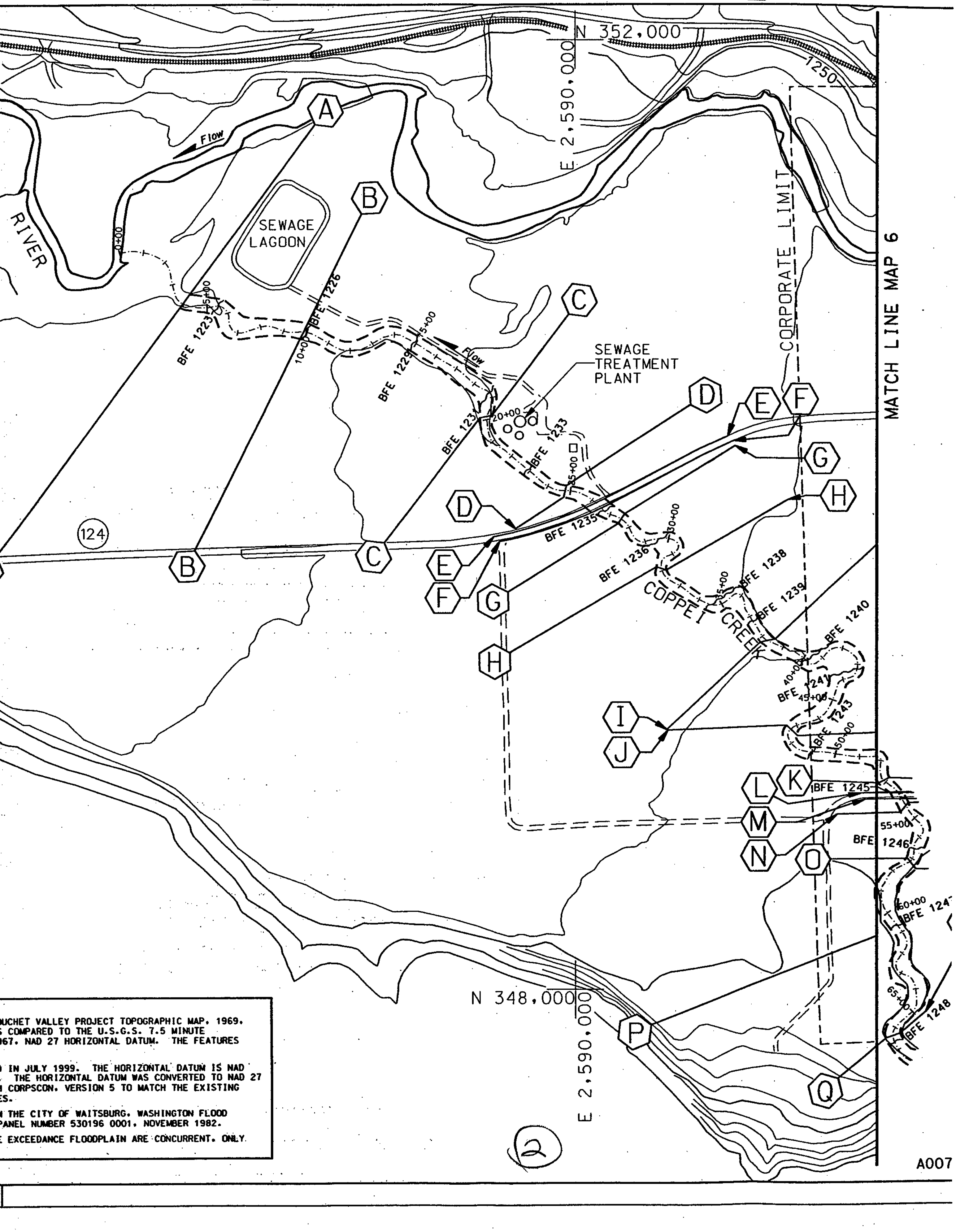
CORPS OF ENGINEERS



NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICAL DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE FLOODWAY BOUNDARY WILL BE SHOWN.

1



UCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969.
S COMPARED TO THE U.S.G.S. 7.5 MINUTE
967, NAD 27 HORIZONTAL DATUM. THE FEATURES

IN JULY 1999. THE HORIZONTAL DATUM IS NAD
THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27
CORPSCON, VERSION 5 TO MATCH THE EXISTING
ES.

THE CITY OF WAITSBURG, WASHINGTON FLOOD
PANEL NUMBER 530196 0001, NOVEMBER 1982.

E EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY

(2)

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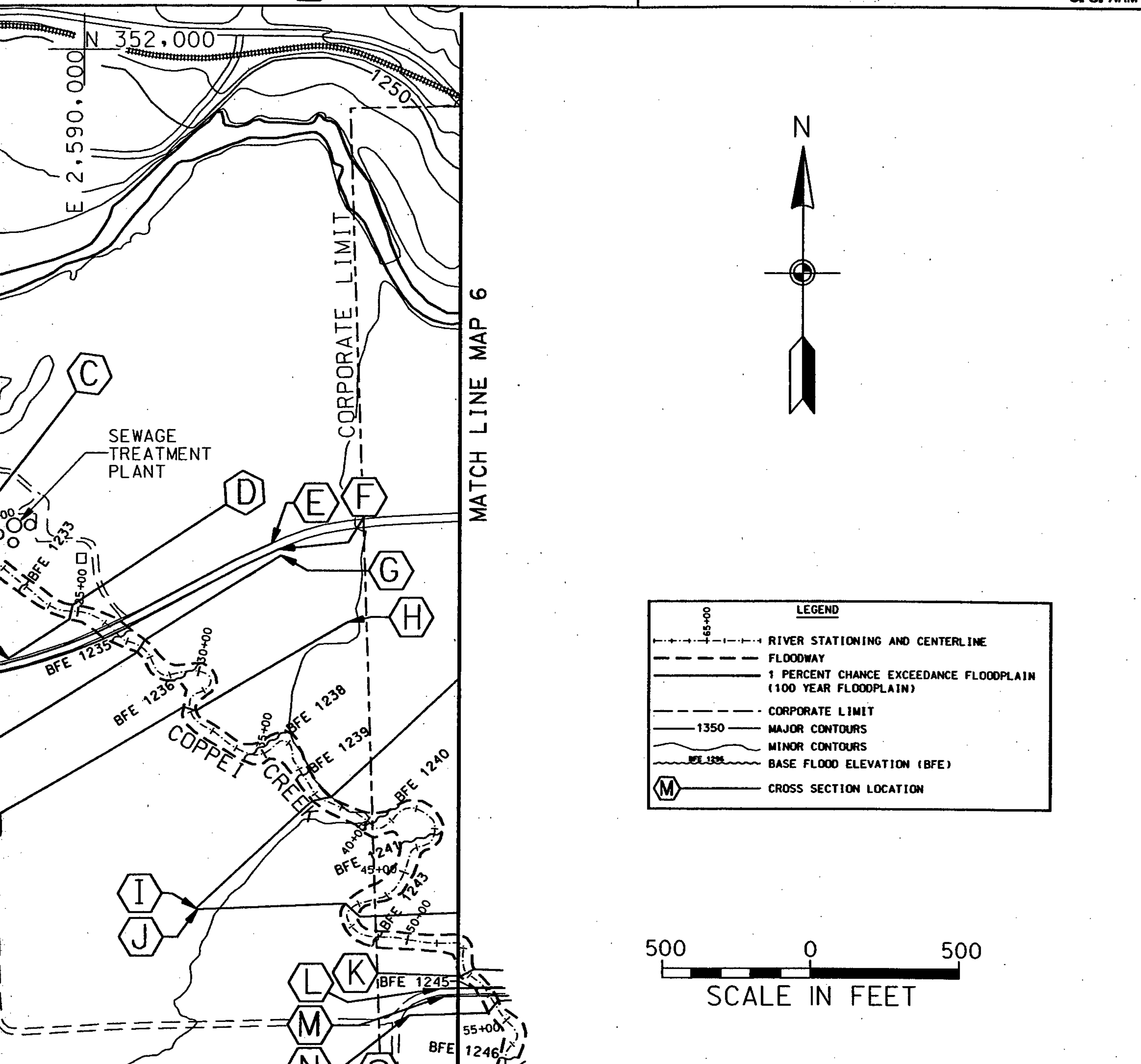


REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED PERCENT CHANCE EXCEEDANCE TO NOTE 4, AND 100-YEAR IN LEGEND. REMOVED 500-YEAR FROM LEGEND.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKER	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

FLOODWAY AND FLOODPLAIN BOUNDARIES

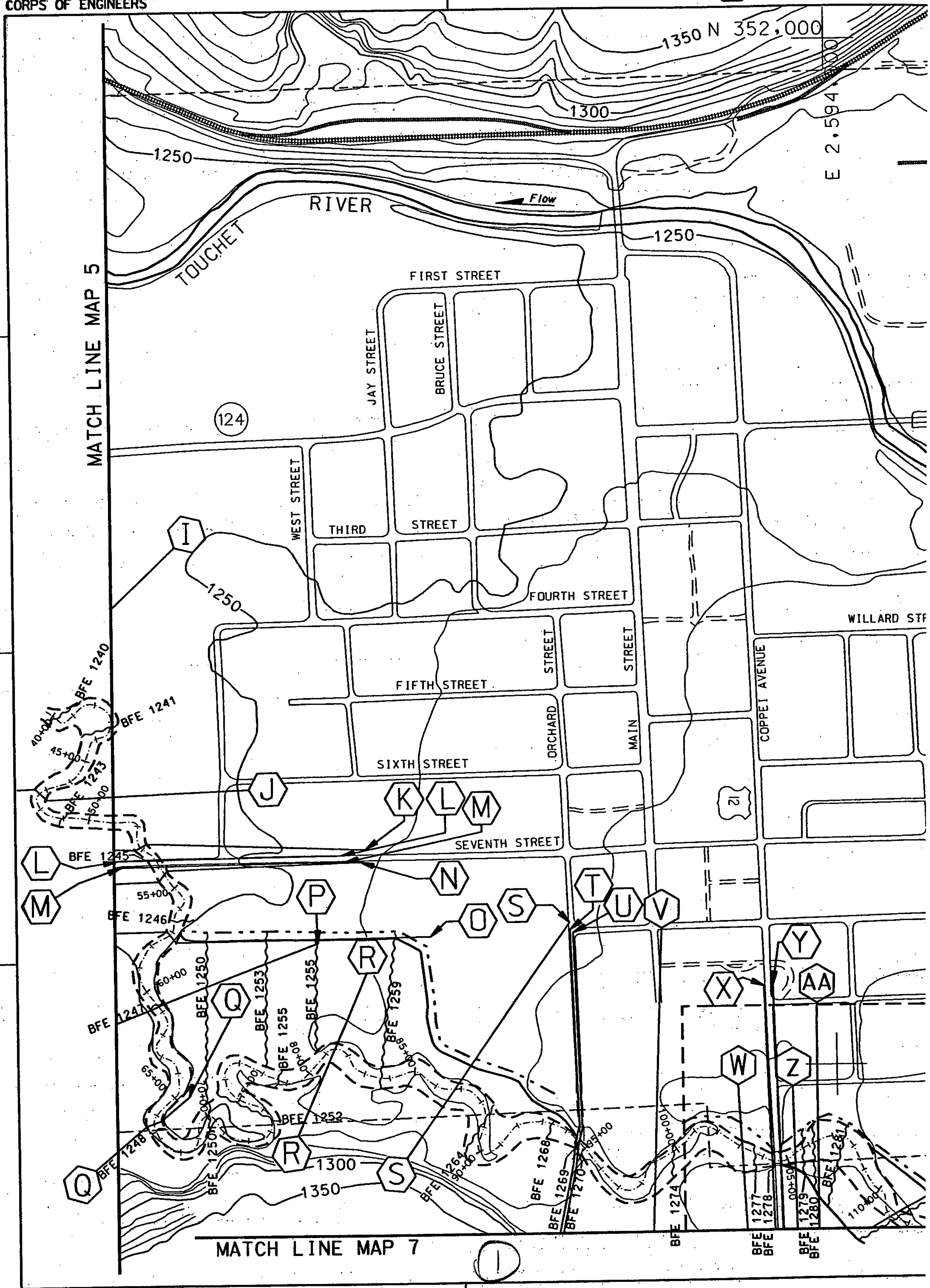
PROPOSED FLOOD CONTROL PROJECT

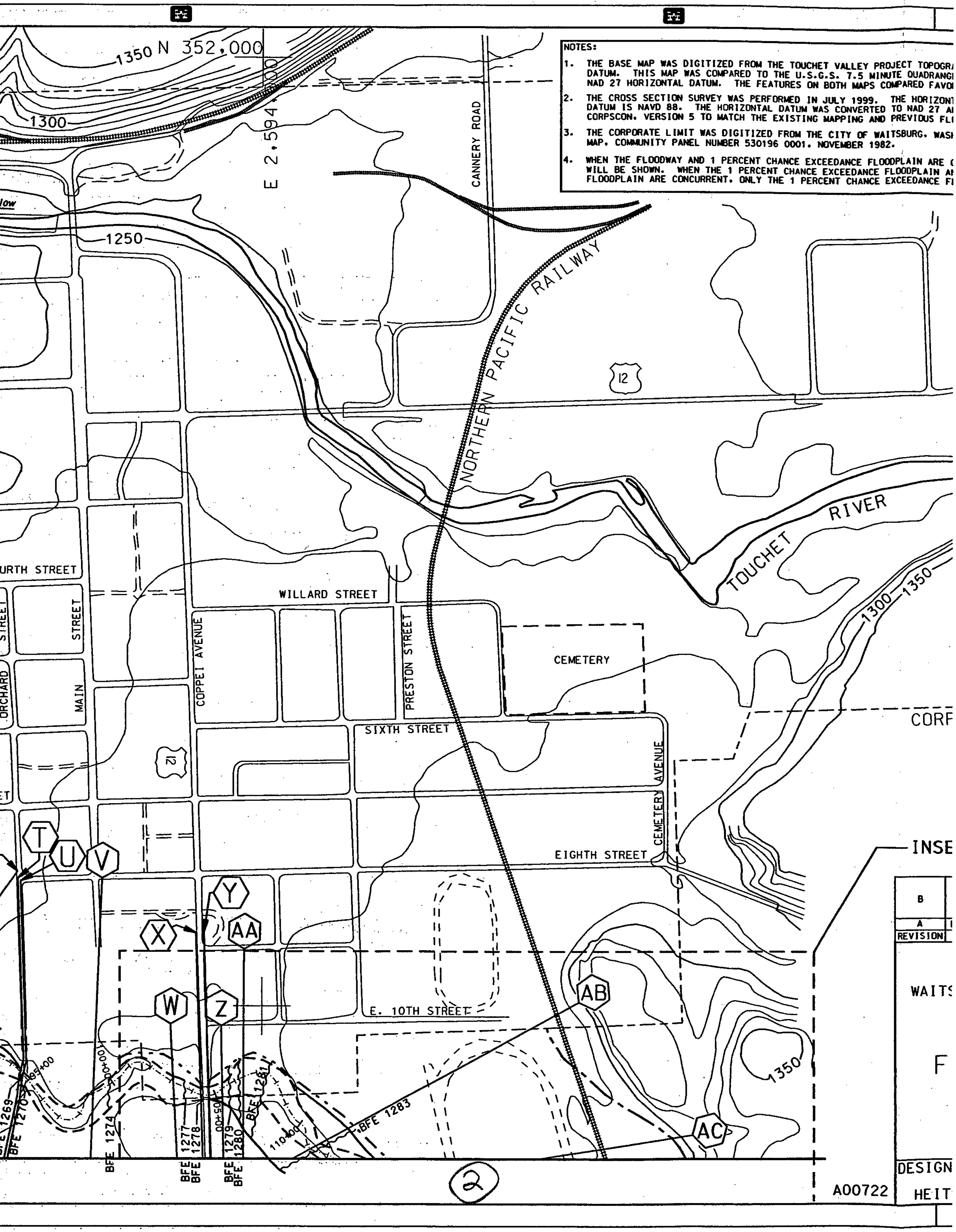
3

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

CORPS OF ENGINEERS




NOTES:
1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGR
DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANG
NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVO
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZON
DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 A
CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FL
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WAS
MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE
WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN A
FLOODPLAIN ARE CONCURRENT, ONLY THE 1 PERCENT CHANCE EXCEEDANCE F
1350 N 352,000
E 2,594,000
1300
1250
CANNERY ROAD
NORTHERN PACIFIC RAILWAY
12
TOUCHET RIVER
1300
1350
URTH STREET
WILLARD STREET
STREET
MAIN
ORCHARD
COPPEI AVENUE
PRESTON STREET
CEMETERY
SIXTH STREET
CEMETERY AVENUE
CORP
EIGHTH STREET
INSE
E. 10TH STREET
T
U
V
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X
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Z
AA
AB
AC
BFE 1269
BFE 1270
BFE 1274
BFE 1277
BFE 1278
BFE 1279
BFE 1280
BFE 1281
BFE 1283
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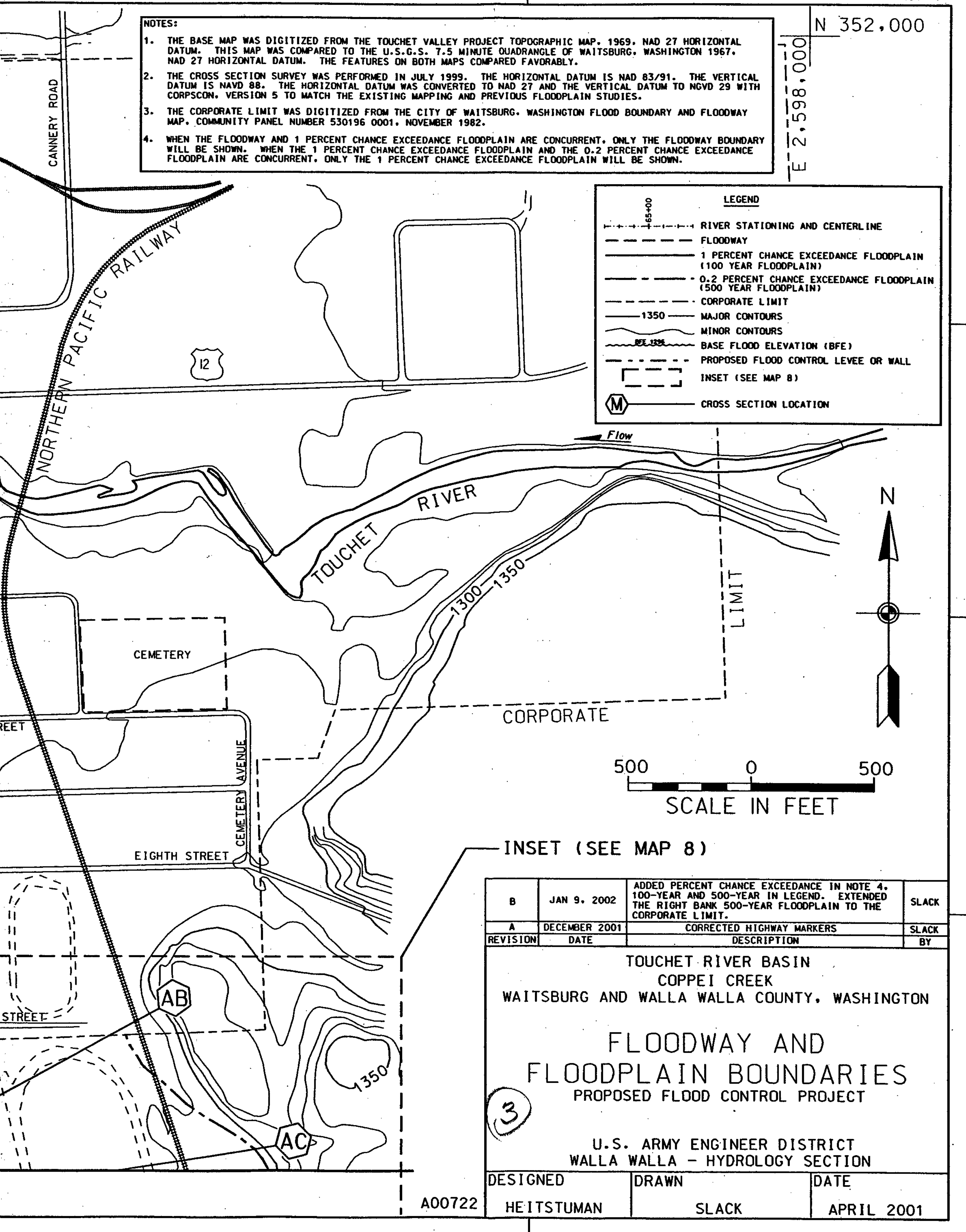
NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICAL DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE FLOODWAY BOUNDARY WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN AND THE 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN WILL BE SHOWN.

LEGEND

- 65+00 RIVER STATIONING AND CENTERLINE
- FLOODWAY
- 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (100 YEAR FLOODPLAIN)
- 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500 YEAR FLOODPLAIN)
- CORPORATE LIMIT
- 1350 MAJOR CONTOURS
- MINOR CONTOURS
- BFE 1336 BASE FLOOD ELEVATION (BFE)
- PROPOSED FLOOD CONTROL LEVEE OR WALL
- INSET (SEE MAP 8)
- (M) CROSS SECTION LOCATION



REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED PERCENT CHANCE EXCEEDANCE IN NOTE 4. 100-YEAR AND 500-YEAR IN LEGEND. EXTENDED THE RIGHT BANK 500-YEAR FLOODPLAIN TO THE CORPORATE LIMIT.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKERS	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

FLOODWAY AND FLOODPLAIN BOUNDARIES

PROPOSED FLOOD CONTROL PROJECT

3

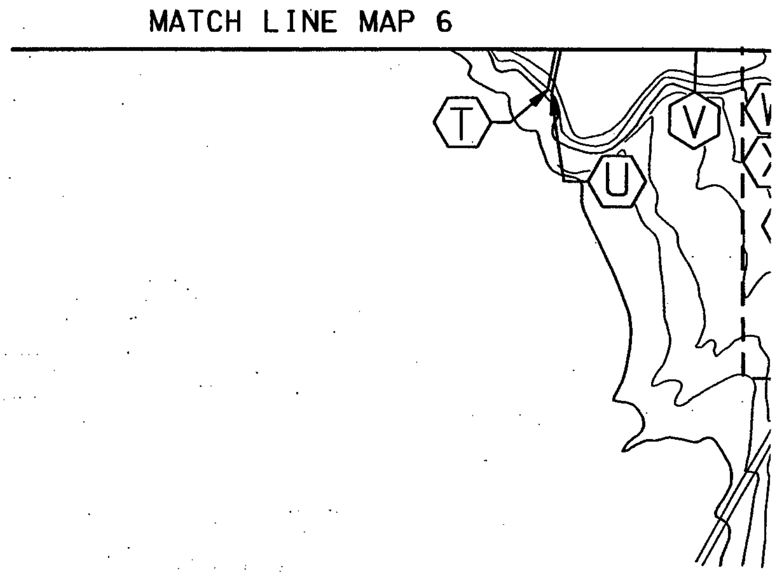
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

CORPS OF ENGINEERS

N 348,000

E 2,590,000



LEGEND

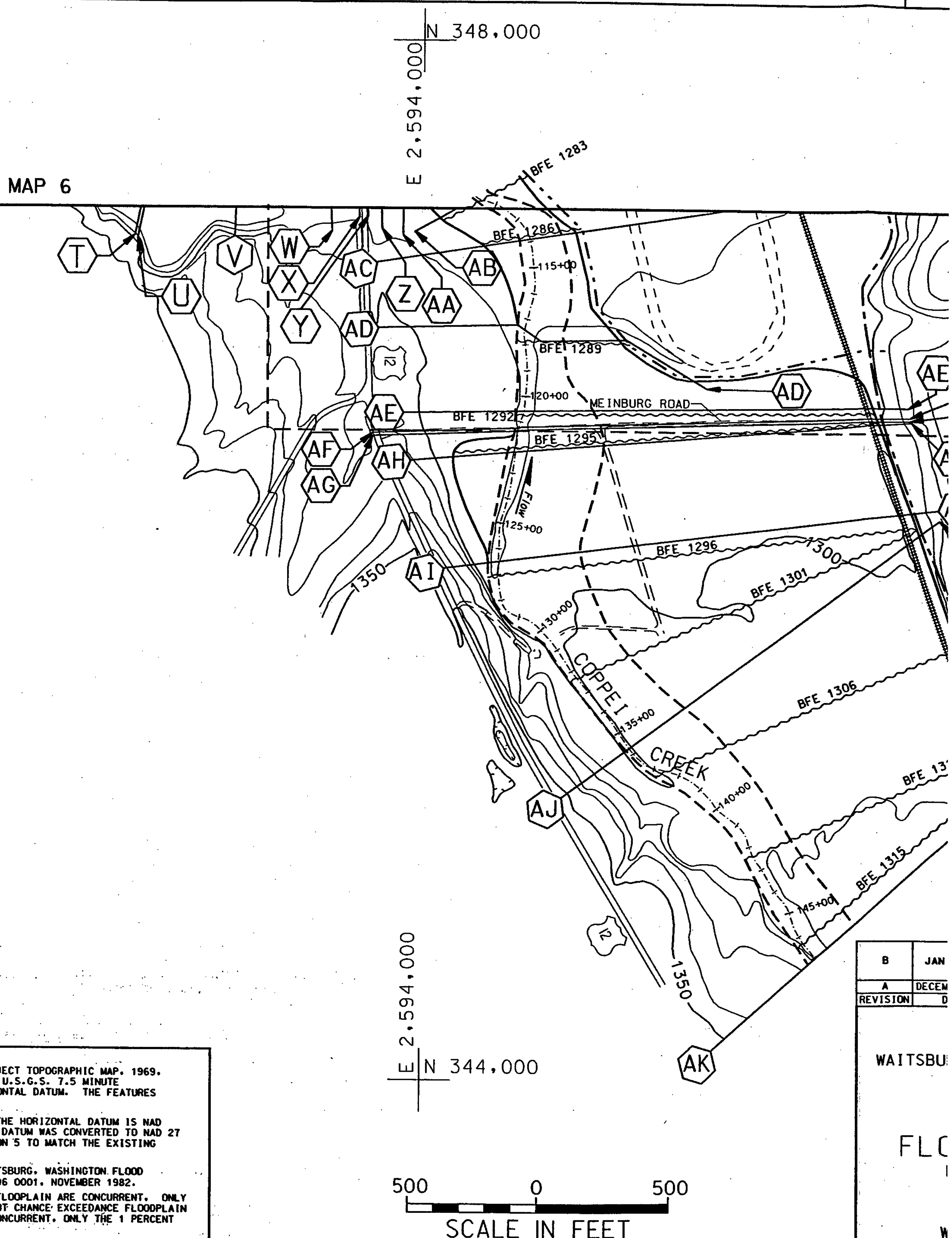
- 65+00 RIVER STATIONING AND CENTERLINE
- FLOODWAY
- 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (100 YEAR FLOODPLAIN)
- 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500 YEAR FLOODPLAIN)
- 1350 MAJOR CONTOURS
- MINOR CONTOURS
- BFE 1296 BASE FLOOD ELEVATION (BFE)
- PROPOSED FLOOD CONTROL LEVEE OR WALL
- INSET (SEE MAP 8)
- M CROSS SECTION LOCATION

E 2,590,000

N 344,000

NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICLE DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27 AND THE VERTICAL DATUM TO NGVD 29 WITH CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND THE 1 PERCENT CHANCE EXCEEDANCE FLOOPLAIN ARE CONCURRENT. ONLY THE FLOODWAY BOUNDARY WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN AND THE 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN WILL BE SHOWN.
5. 0.2 PERCENT CHANCE EXCEEDANCE FLOOPLAIN (500-YEAR FLOODPLAIN) BOUNDARIES ARE TERMINATED AT THE EXTENTS OF THE ALLUVIAL FAN. SEE MAP 9.



RLINE

E FLOODPLAIN

NCE FLOODPLAIN

EE OR WALL

CHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969.
COMPARED TO THE U.S.G.S. 7.5 MINUTE
7, NAD 27 HORIZONTAL DATUM. THE FEATURES

IN JULY 1999. THE HORIZONTAL DATUM IS NAD
THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27
CORPSCON, VERSION 5 TO MATCH THE EXISTING

THE CITY OF WAITSBURG, WASHINGTON FLOOD
NEL NUMBER 530196 0001, NOVEMBER 1982.

NCE EXCEEDANCE FLOOPLAIN ARE CONCURRENT. ONLY
HEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN
LOODPLAIN ARE CONCURRENT. ONLY THE 1 PERCENT
OWN.

(500-YEAR FLOODPLAIN) BOUNDARIES ARE TERMINATED
E MAP 9.

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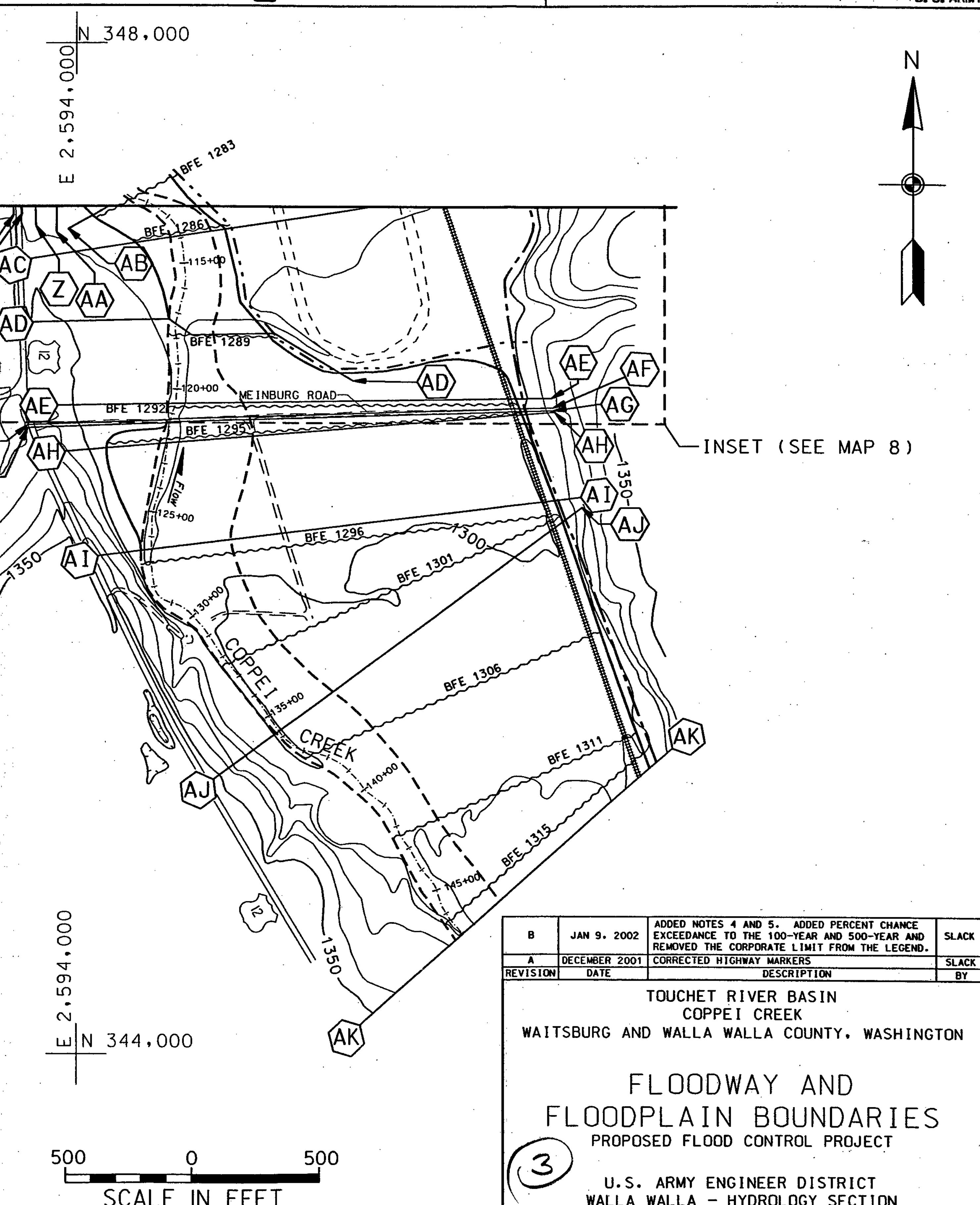
U. S. ARMY



A00723

REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED NOTES 4 AND 5. ADDED PERCENT CHANCE EXCEEDANCE TO THE 100-YEAR AND 500-YEAR AND REMOVED THE CORPORATE LIMIT FROM THE LEGEND.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKERS	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

FLOODWAY AND FLOODPLAIN BOUNDARIES

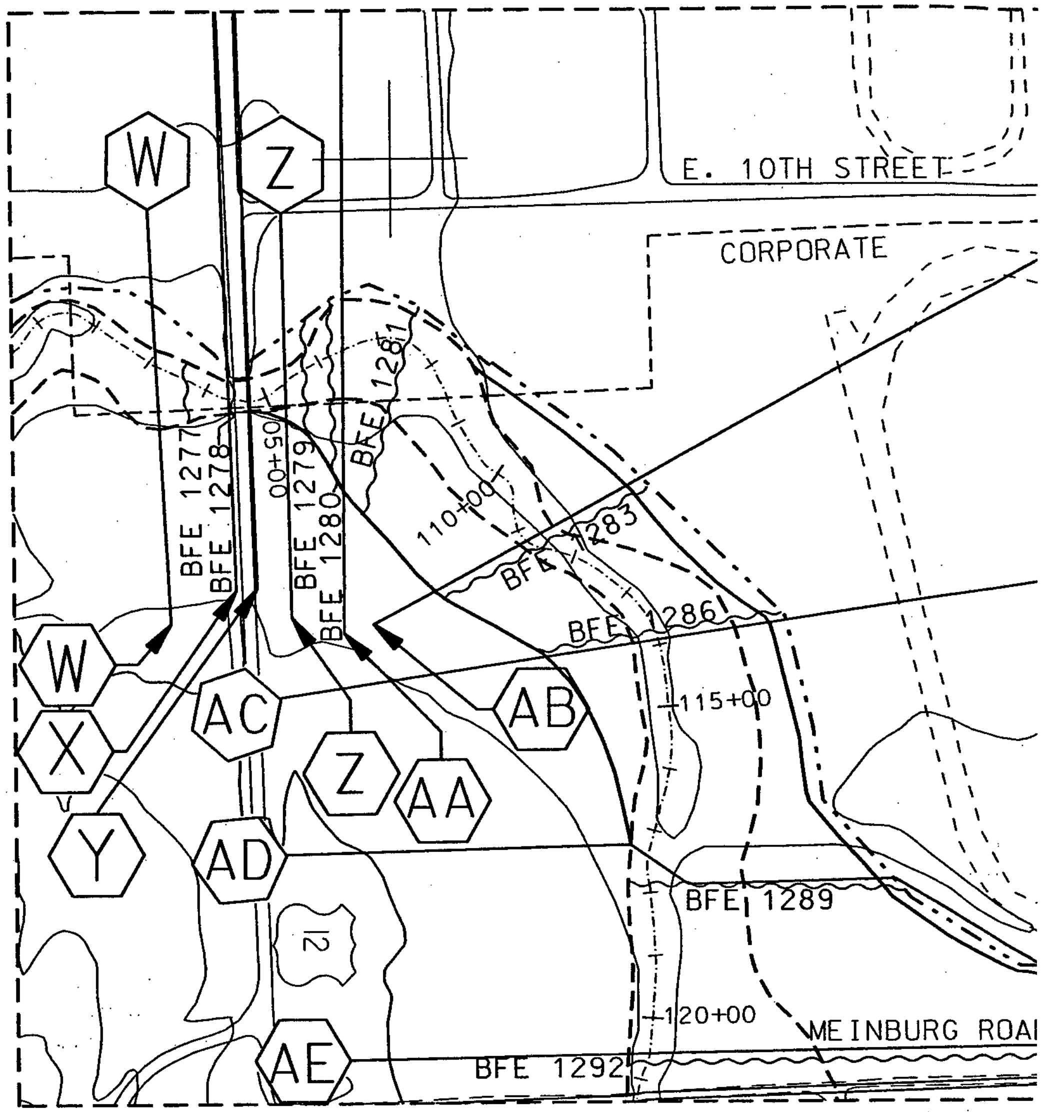
PROPOSED FLOOD CONTROL PROJECT

3

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

CORPS OF ENGINEERS



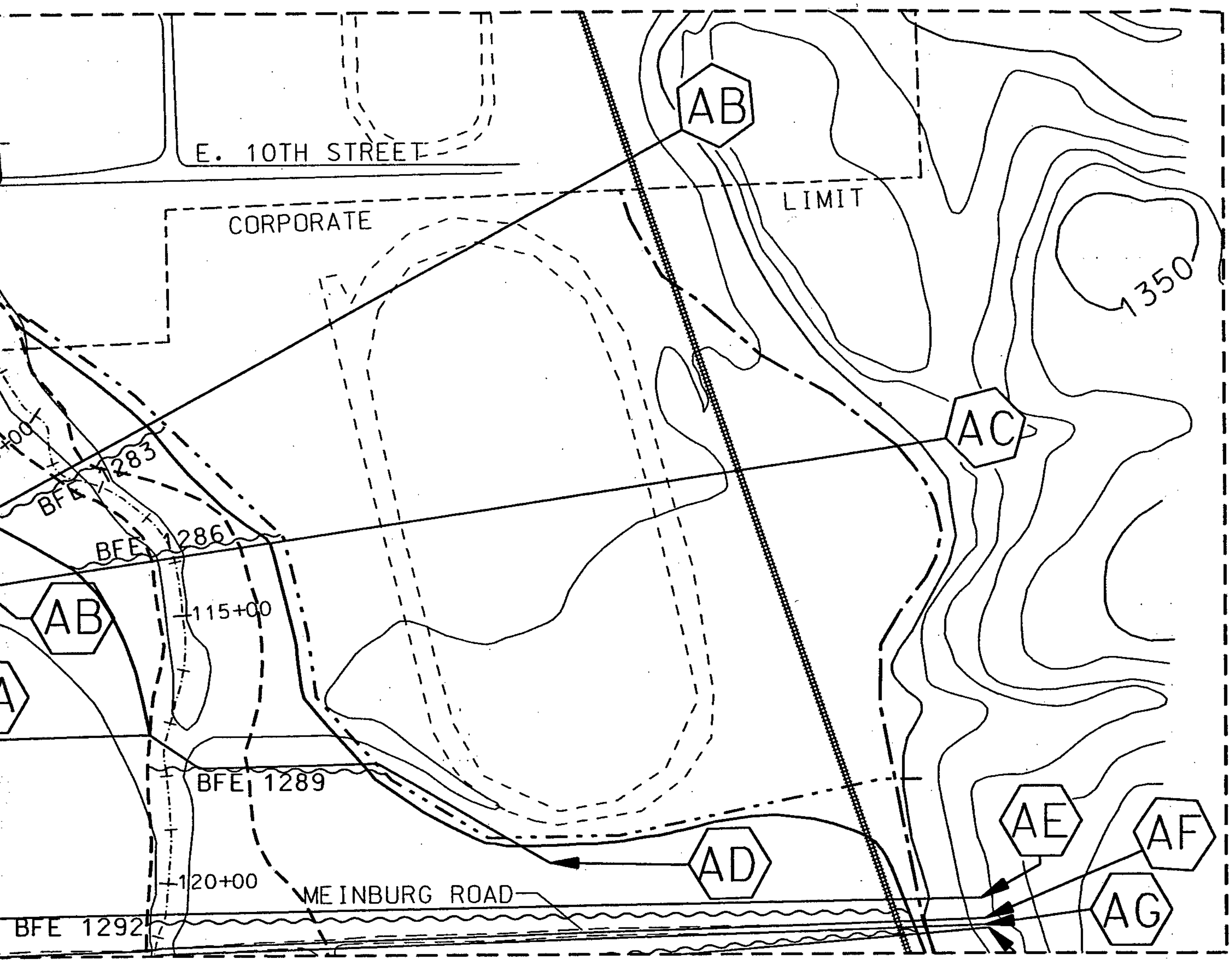
LEGEND

- RIVER STATIONING AND CENTERLINE
- FLOODWAY
- 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (100 YEAR FLOODPLAIN)
- 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500 YEAR FLOODPLAIN)
- CORPORATE LIMIT
- 1350 MAJOR CONTOURS
- MINOR CONTOURS
- BFE 1286 BASE FLOOD ELEVATION (BFE)
- PROPOSED FLOOD CONTROL LEVEE OR WALL
- INSET (SEE MAP 4)
- (M) CROSS SECTION LOCATION

NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CROSS SECTION SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD 83/91. THE VERTICLE DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 2 AND THE VERTICAL DATUM TO NGVD 29 WITH CORPSCON, VERSION 5 TO MATCH THE EXISTING MAPPING AND PREVIOUS FLOODPLAIN STUDIES.
3. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
4. WHEN THE FLOODWAY AND THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, O THE FLOODWAY BOUNDARY WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPL AND THE 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT, ONLY THE 1 PERCEN CHANCE EXCEEDANCE FLOODPLAIN WILL BE SHOWN.
5. 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500-YEAR FLOODPLAIN) BOUNDARIES ARE TERM AT THE EXTENTS OF THE ALLUVIAL FAN. SEE MAP 9.

J



B	JAN 9. 2
A	DECEMBER
REVISION	DATE

WAITSBURG

FLOO

PRC

U.

WALI

DESIGNED

HEITSTUM

GITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP. 1969.
DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE
SBURG. WASHINGTON 1967. NAD 27 HORIZONTAL DATUM. THE FEATURES
RED FAVORABLY.

SURVEY WAS PERFORMED IN JULY 1999. THE HORIZONTAL DATUM IS NAD
LE DATUM IS NAVD 88. THE HORIZONTAL DATUM WAS CONVERTED TO NAD 27
ATUM TO NGVD 29 WITH CORPSCON. VERSION 5 TO MATCH THE EXISTING
US FLOODPLAIN STUDIES.

T WAS DIGITIZED FROM THE CITY OF WAITSBURG. WASHINGTON FLOOD
WAY MAP. COMMUNITY PANEL NUMBER 530196 0001. NOVEMBER 1982.

AND THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT. ONLY
ARY WILL BE SHOWN. WHEN THE 1 PERCENT CHANCE EXCEEDANCE FLOODPLAIN
T CHANCE EXCEEDANCE FLOODPLAIN ARE CONCURRENT. ONLY THE 1 PERCENT
FLOODPLAIN WILL BE SHOWN.

EXCEEDANCE FLOODPLAIN (500-YEAR FLOODPLAIN) BOUNDARIES ARE TERMINATED
THE ALLUVIAL FAN. SEE MAP 9.

300 0 300

SCALE IN FEET

2

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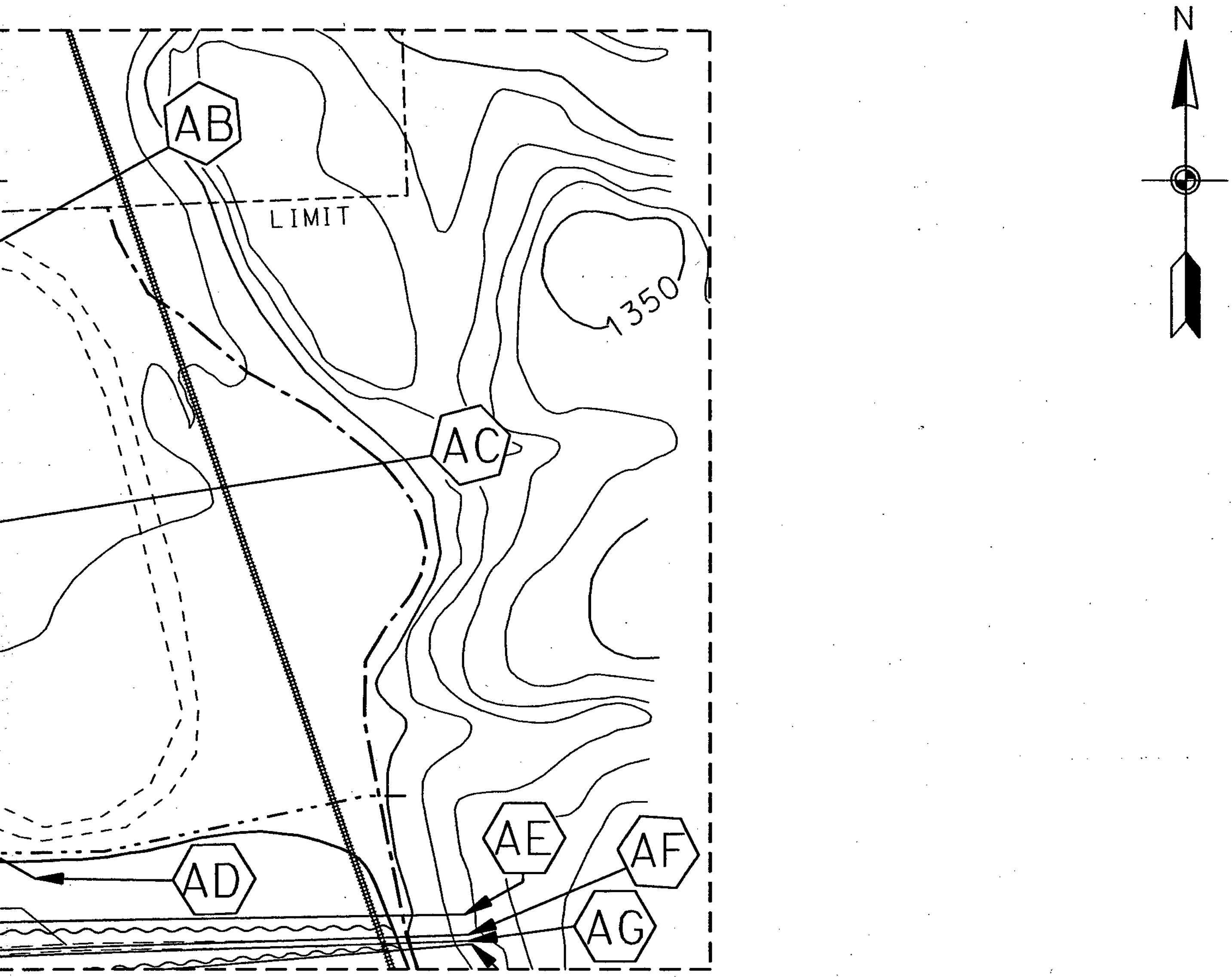

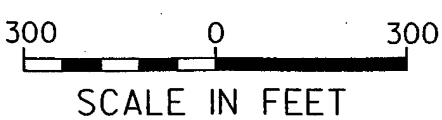

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A00724

REVISION	DATE	DESCRIPTION	BY
B	JAN 9, 2002	ADDED NOTES 4 AND 5. ADDED PERCENT CHANCE EXCEEDANCE TO THE 100-YEAR AND 500-YEAR IN THE LEGEND. EXTENDED THE RIGHT BANK 500 YEAR FLOODPLAIN TO THE CORPORATE LIMIT.	SLACK
A	DECEMBER 2001	CORRECTED HIGHWAY MARKER AND SCALE	SLACK

TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON

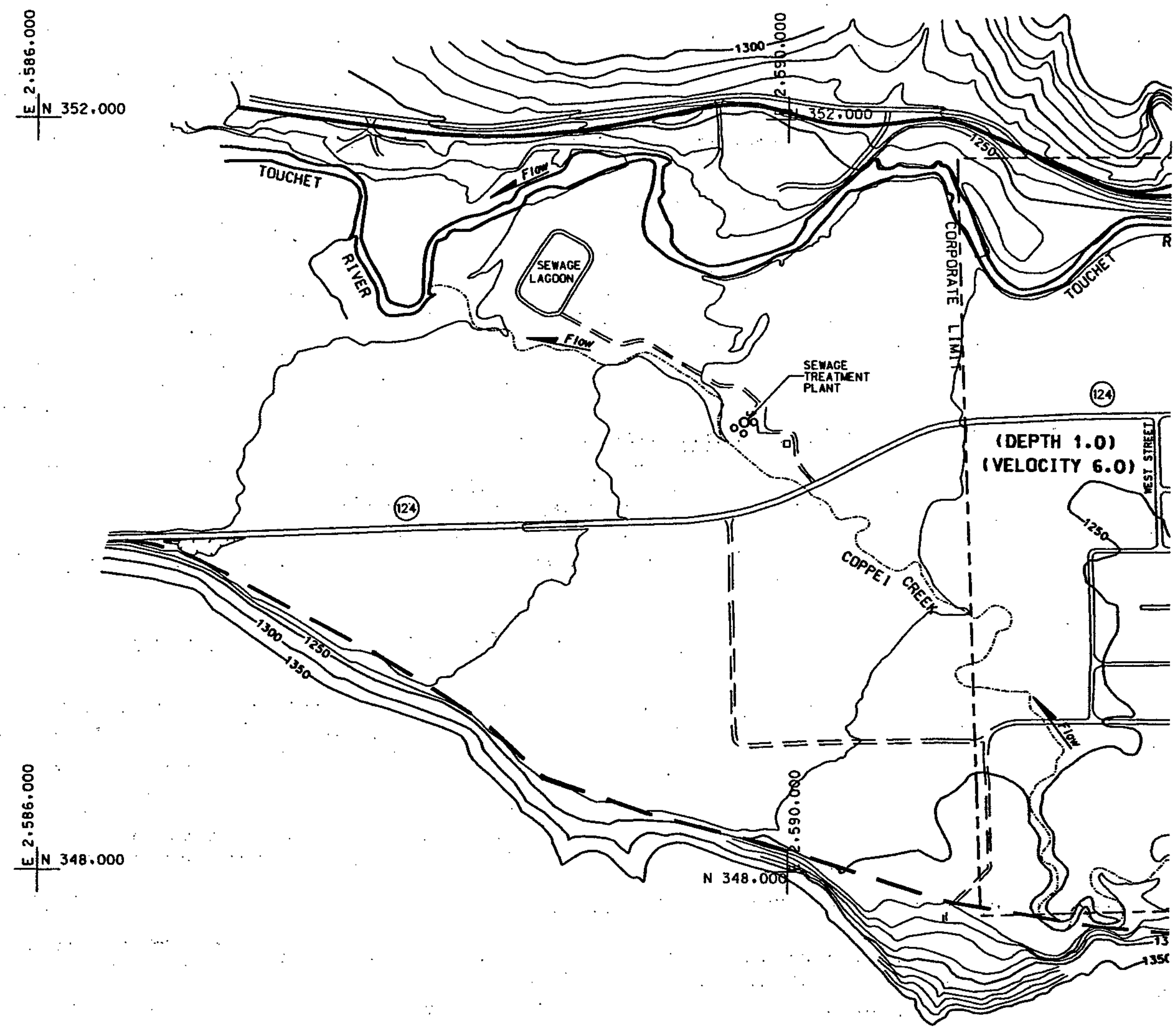
FLOODWAY AND FLOODPLAIN BOUNDARIES

PROPOSED FLOOD CONTROL PROJECT

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION

DESIGNED	DRAWN	DATE
HEITSTUMAN	SLACK	APRIL 2001

CORPS OF ENGINEERS



NOTES:

1. THE BASE MAP WAS DIGITIZED FROM THE TOUCHET VALLEY PROJECT TOPOGRAPHIC MAP, 1969, NAD 27 HORIZONTAL DATUM. THIS MAP WAS COMPARED TO THE U.S.G.S. 7.5 MINUTE QUADRANGLE OF WAITSBURG, WASHINGTON 1967, NAD 27 HORIZONTAL DATUM. THE FEATURES ON BOTH MAPS COMPARED FAVORABLY.
2. THE CORPORATE LIMIT WAS DIGITIZED FROM THE CITY OF WAITSBURG, WASHINGTON FLOOD BOUNDARY AND FLOODWAY MAP, COMMUNITY PANEL NUMBER 530196 0001, NOVEMBER 1982.
3. ALLUVIAL FAN VELOCITY IS IN FEET PER SECOND AND DEPTH IS IN FEET.
4. THE 0.2 PERCENT CHANCE EXCEEDANCE FLOODPLAIN (500-YEAR FLOODPLAIN) BOUNDARY TERMINATES AT THE EXTENTS OF THE ALLUVIAL FAN SINCE THE FLOW PATH IS NOT PREDICTABLE, FOR THIS EVENT, DOWNSTREAM OF THIS POINT.

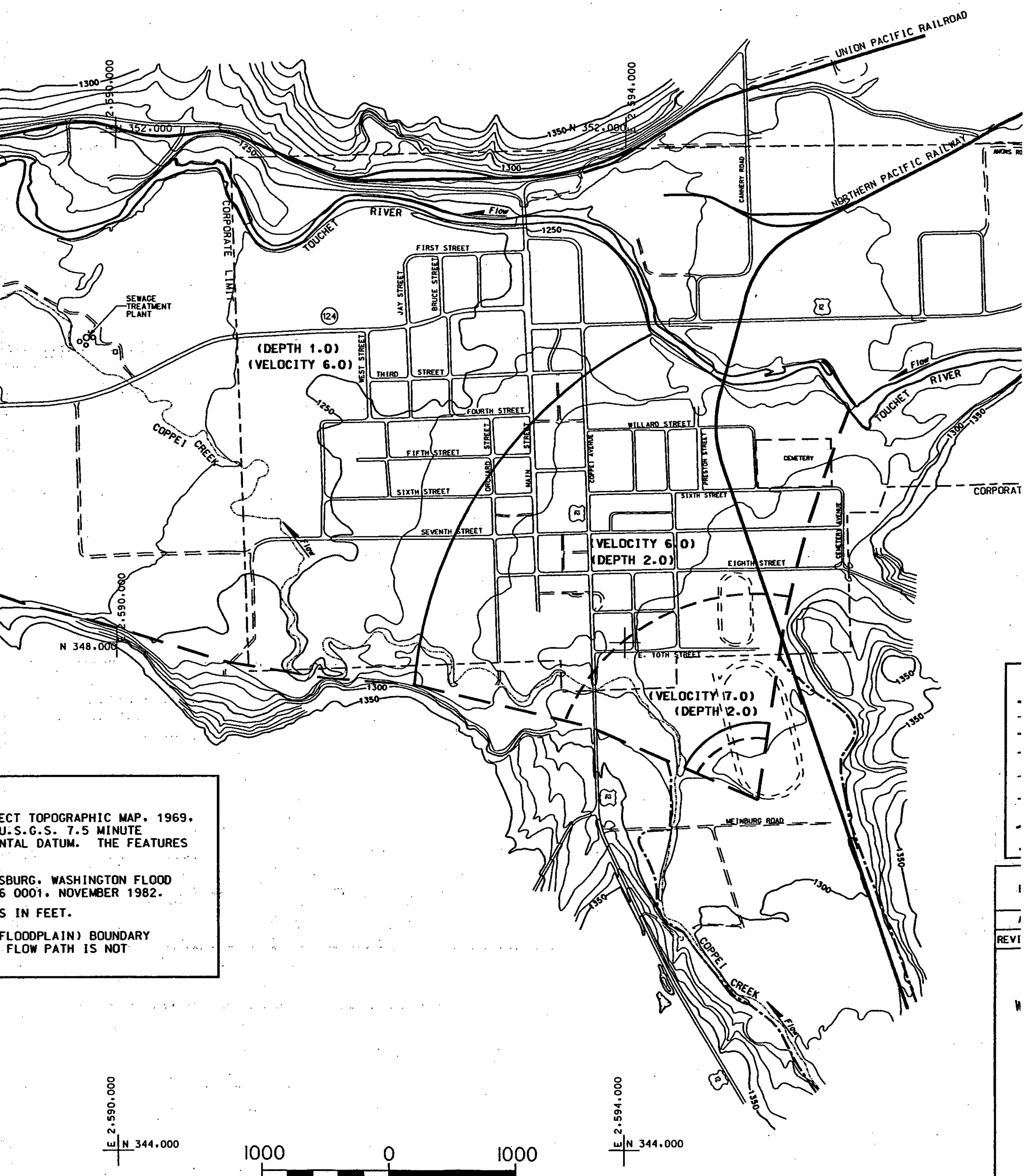
E 2.586.000 N 344.000

E 2.590.000 N 344.000

1000

SCALE

(1)



ECT TOPOGRAPHIC MAP, 1969.
U.S.G.S. 7.5 MINUTE
NTAL DATUM. THE FEATURES

SBURG, WASHINGTON FLOOD
6 0001, NOVEMBER 1982.

S IN FEET.

FLOODPLAIN) BOUNDARY
FLOW PATH IS NOT

2

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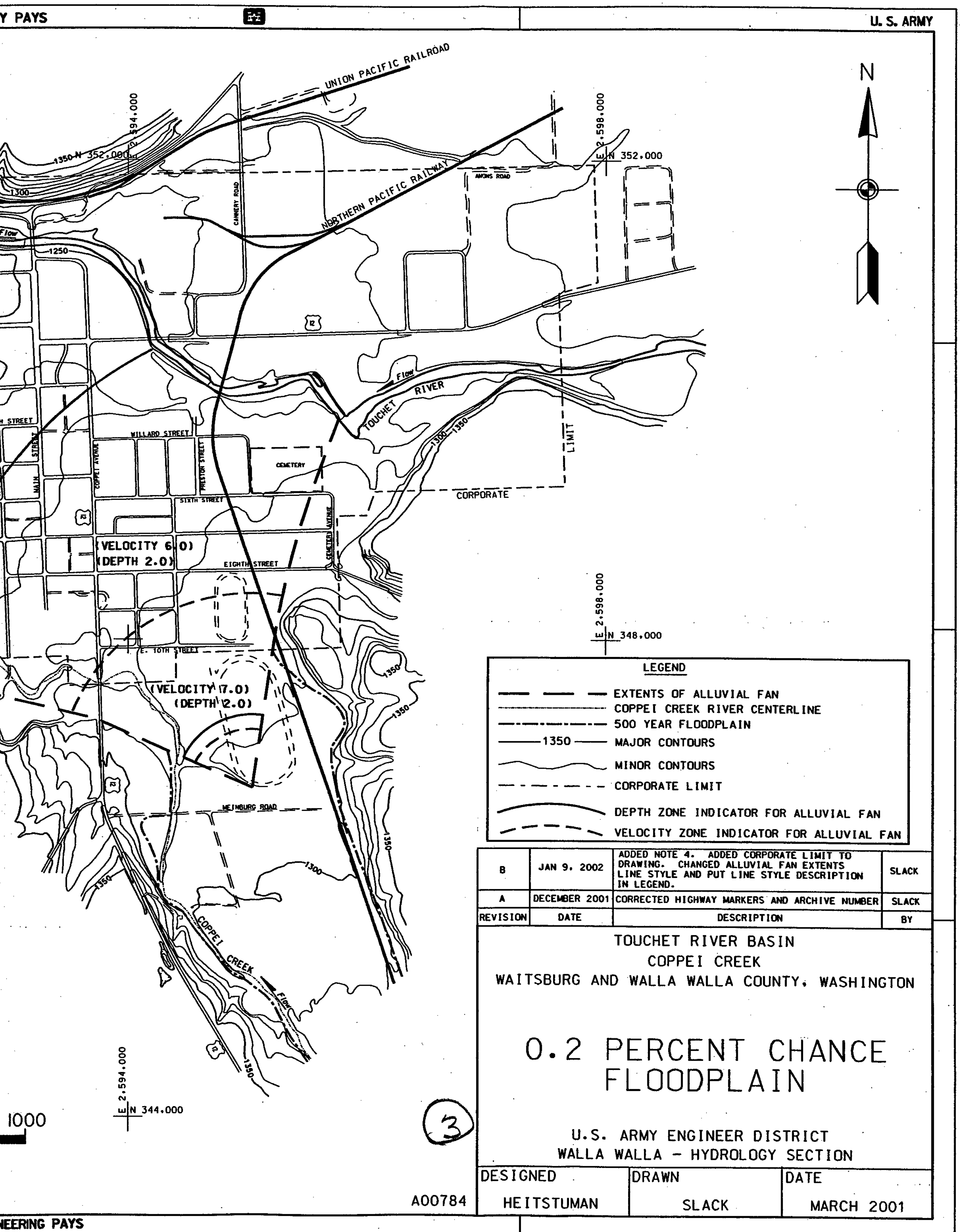
DE:

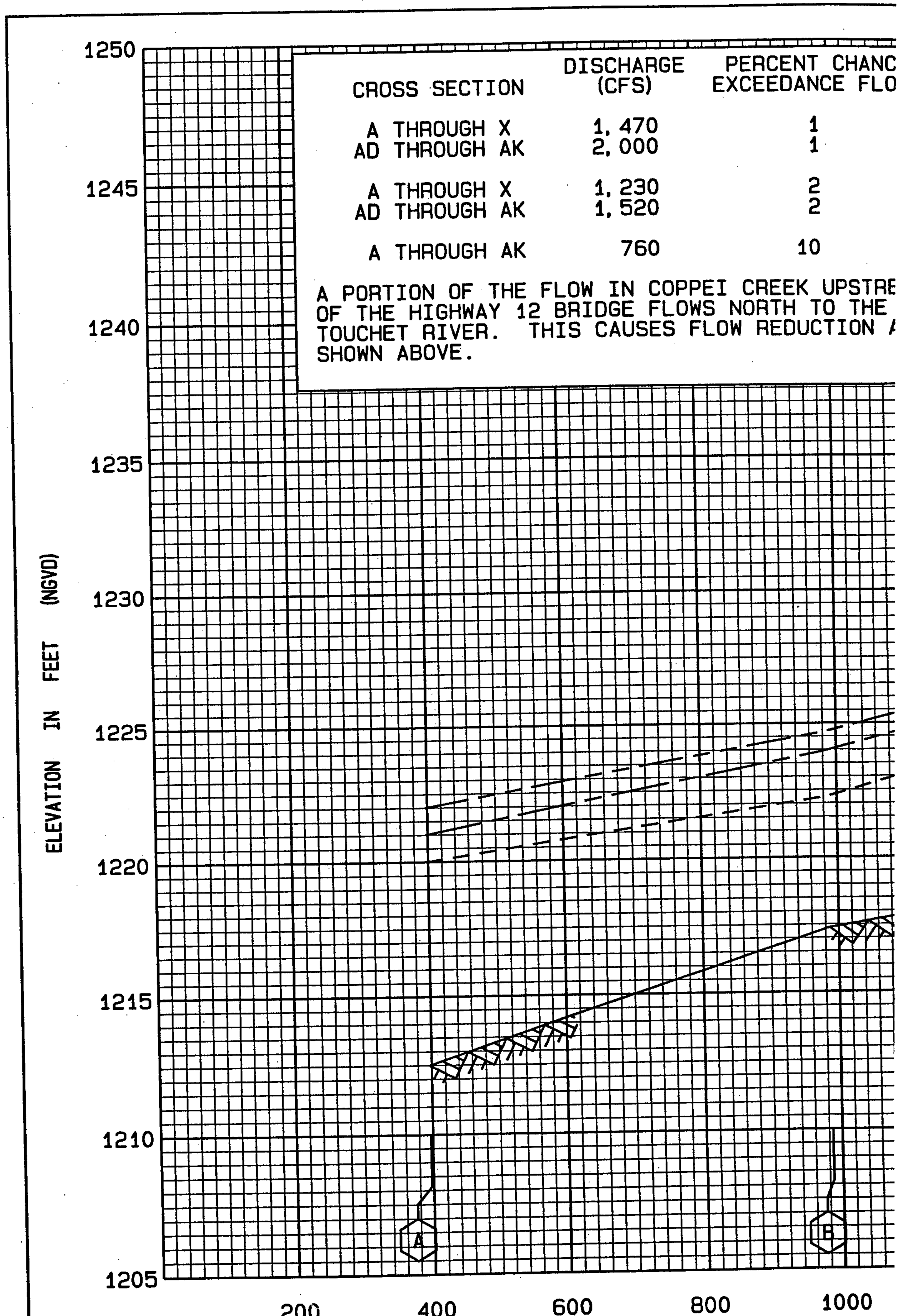

Y PAYS
U. S. ARMY
UNION PACIFIC RAILROAD
NORTHERN PACIFIC RAILWAY
CANNERY ROAD
AMONS ROAD
N
E 2,594.000
N 352.000
E 2,598.000
N 352.000
1350
1300
1250
Flow
TOUCHET RIVER
Flow
WILLARD STREET
MAIN STREET
COPPEI AVENUE
PRESTON STREET
CEMETERY
SIXTH STREET
CEMETERY AVENUE
EIGHTH STREET
E. 10TH STREET
(VELOCITY 6.0)
(DEPTH 2.0)
(VELOCITY 7.0)
(DEPTH 2.0)
CORPORATE
LIMIT
MEINBURG ROAD
COPPEI CREEK
Flow
E 2,598.000
N 348.000
E 2,594.000
N 344.000
1000
LEGEND
EXTENTS OF ALLUVIAL FAN
COPPEI CREEK RIVER CENTERLINE
500 YEAR FLOODPLAIN
1350 MAJOR CONTOURS
MINOR CONTOURS
CORPORATE LIMIT
DEPTH ZONE INDICATOR FOR ALLUVIAL FAN
VELOCITY ZONE INDICATOR FOR ALLUVIAL FAN
B | JAN 9, 2002 | ADDED NOTE 4. ADDED CORPORATE LIMIT TO DRAWING. CHANGED ALLUVIAL FAN EXTENTS LINE STYLE AND PUT LINE STYLE DESCRIPTION IN LEGEND. | SLACK
A | DECEMBER 2001 | CORRECTED HIGHWAY MARKERS AND ARCHIVE NUMBER | SLACK
REVISION | DATE | DESCRIPTION | BY
TOUCHET RIVER BASIN
COPPEI CREEK
WAITSBURG AND WALLA WALLA COUNTY, WASHINGTON
0.2 PERCENT CHANCE FLOODPLAIN
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA - HYDROLOGY SECTION
DESIGNED HEITSTUMAN
DRAWN SLACK
DATE MARCH 2001
A00784
3
NEERING PAYS

MAP 9

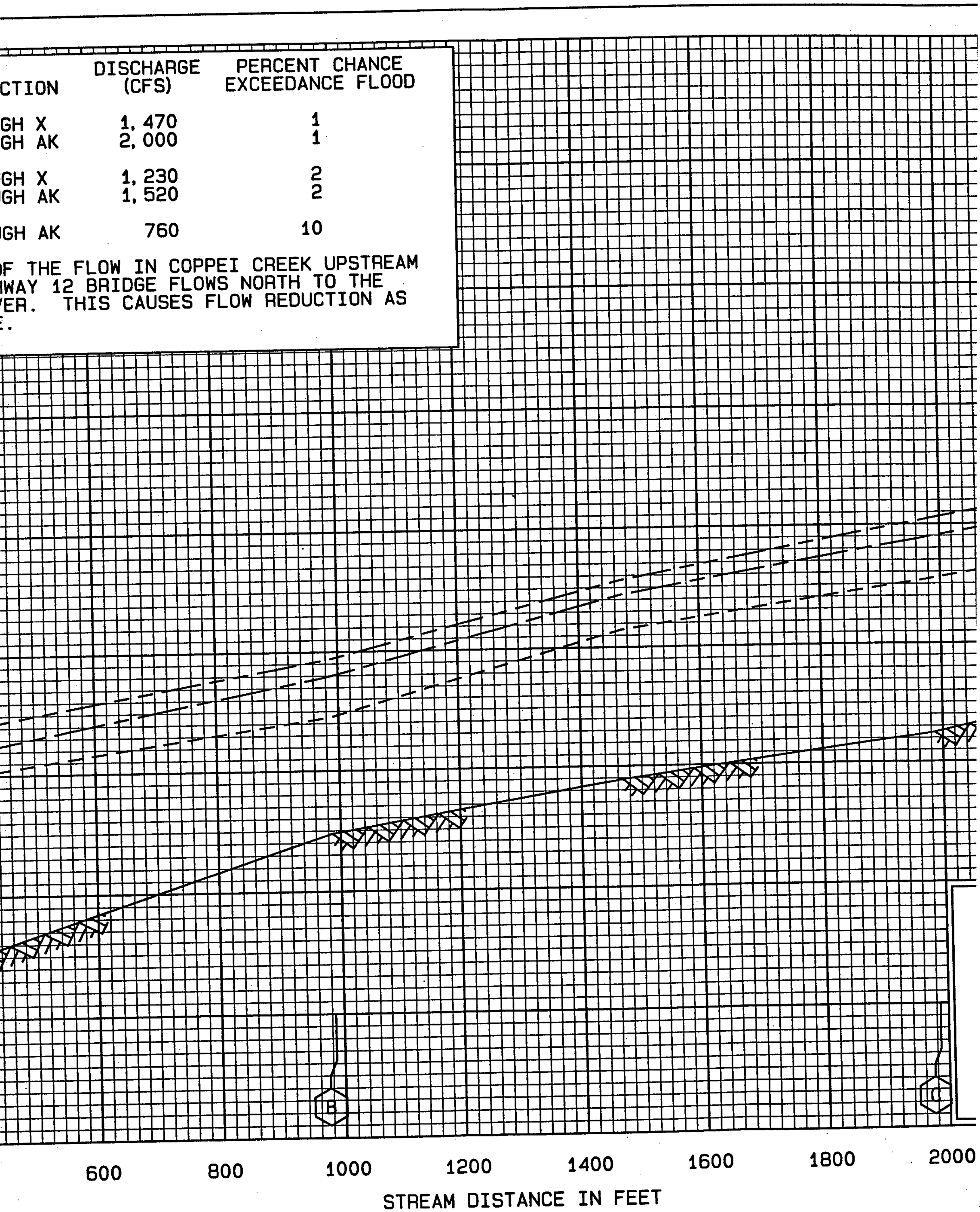
APPENDIX B

HYDROLOGY

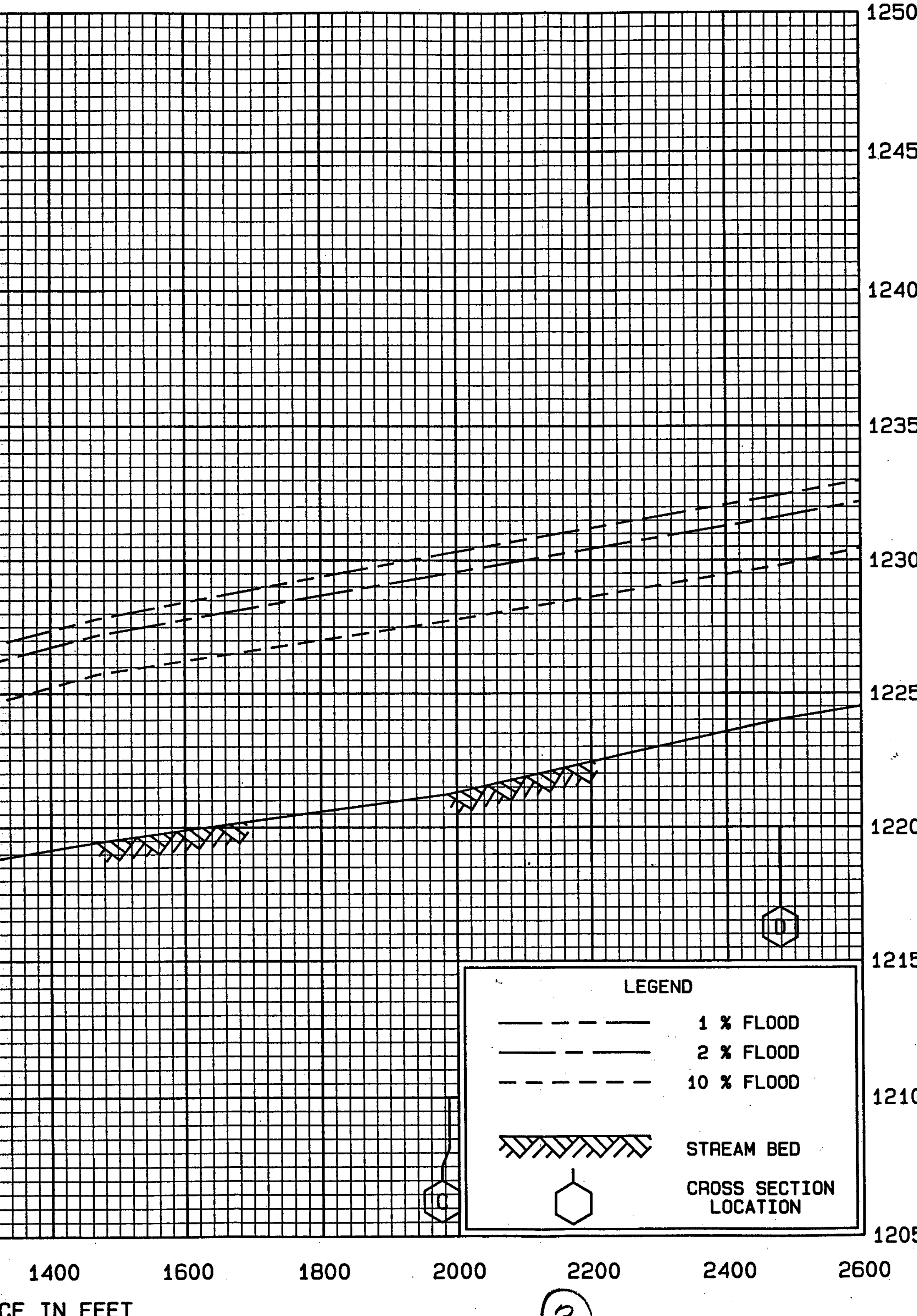
PLATES



CROSS SECTION
DISCHARGE (CFS)
PERCENT CHANC
EXCEEDANCE FLO
A THROUGH X 1,470 1
AD THROUGH AK 2,000 1
A THROUGH X 1,230 2
AD THROUGH AK 1,520 2
A THROUGH AK 760 10
A PORTION OF THE FLOW IN COPPEI CREEK UPSTRE
OF THE HIGHWAY 12 BRIDGE FLOWS NORTH TO THE
TOUCHET RIVER. THIS CAUSES FLOW REDUCTION
SHOWN ABOVE.
1250
1245
1240
1235
1230
1225
1220
1215
1210
1205
ELEVATION IN FEET (NGVD)
200
400
600
800
1000
A
B



CTION
DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
GH X 1,470 1
GH AK 2,000 1
GH X 1,230 2
GH AK 1,520 2
GH AK 760 10
F THE FLOW IN COPPEI CREEK UPSTREAM
WAY 12 BRIDGE FLOWS NORTH TO THE
ER. THIS CAUSES FLOW REDUCTION AS
E.
B
C
600
800
1000
1200
1400
1600
1800
2000
STREAM DISTANCE IN FEET



FLOOD PROFILES MARCH 2001

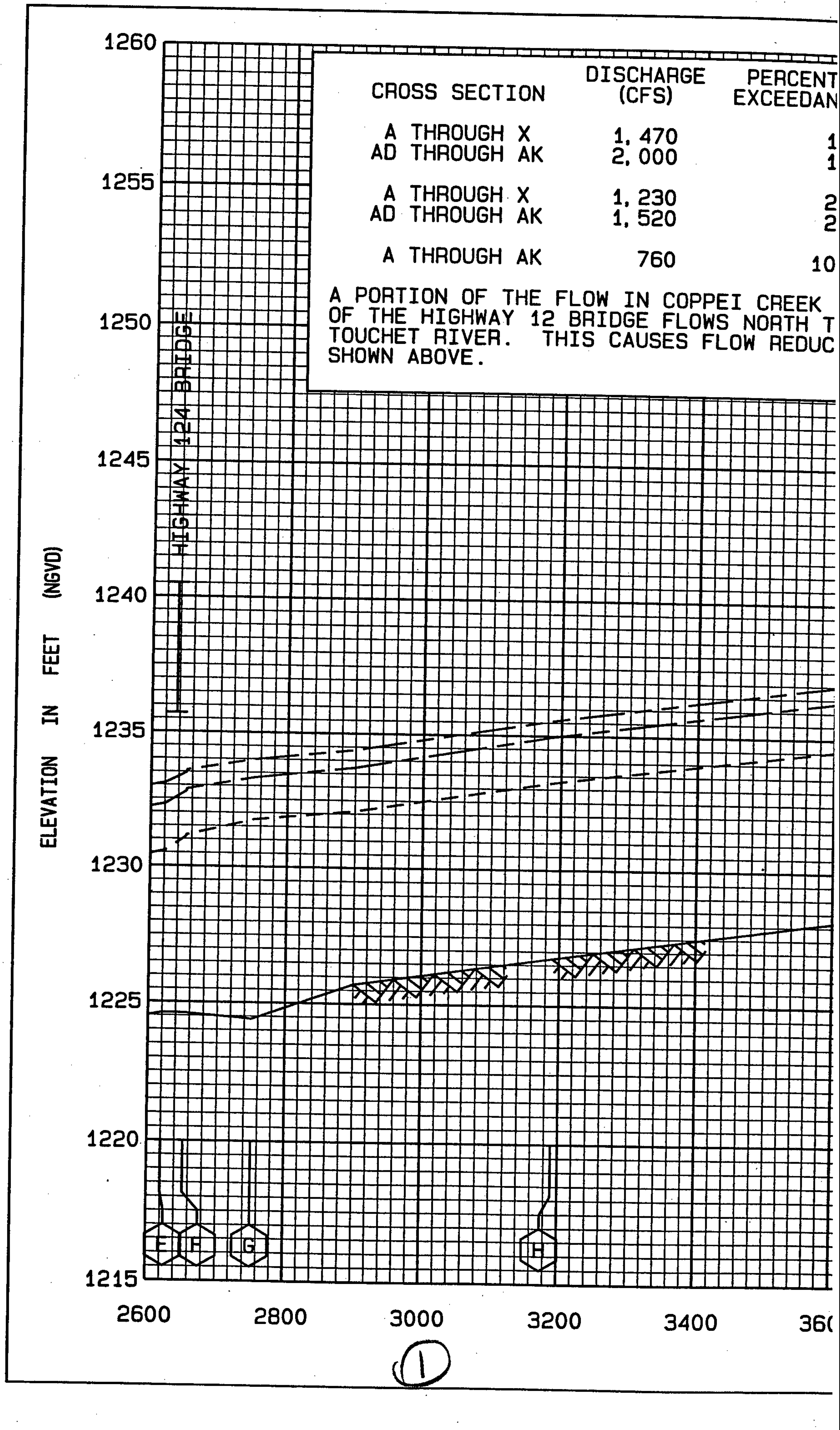
COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

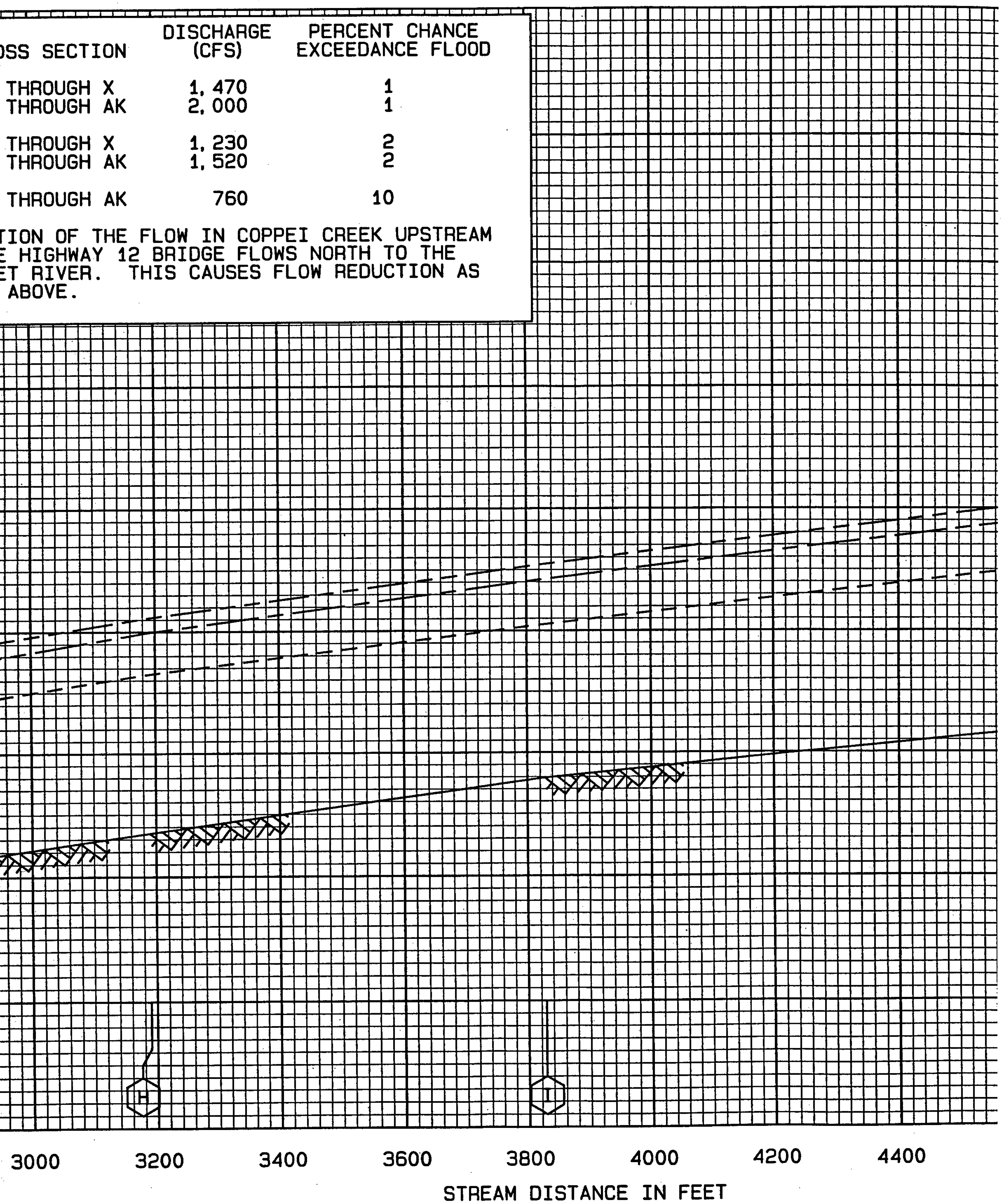
WAITSBURG, WASHINGTON

WALLA WALLA COUNTY

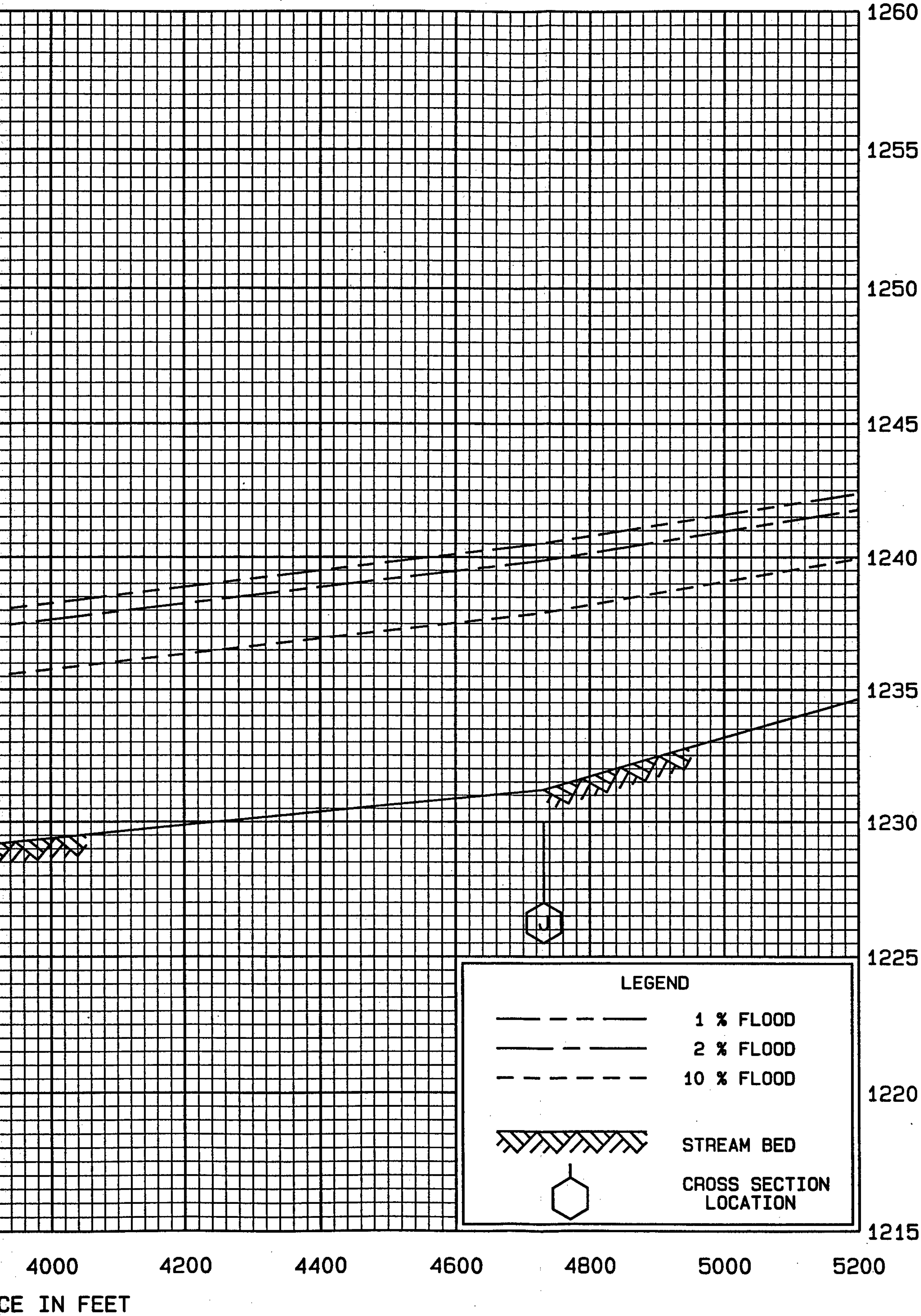
PLATE 1



CROSS SECTION
DISCHARGE (CFS)
PERCENT EXCEEDAN
A THROUGH X
AD THROUGH AK
1,470
2,000
1
1
A THROUGH X
AD THROUGH AK
1,230
1,520
2
2
A THROUGH AK
760
10
A PORTION OF THE FLOW IN COPPEI CREEK
OF THE HIGHWAY 12 BRIDGE FLOWS NORTH T
TOUCHET RIVER. THIS CAUSES FLOW REDUC
SHOWN ABOVE.
HIGHWAY 124 BRIDGE
ELEVATION IN FEET (NGVD)
1260
1255
1250
1245
1240
1235
1230
1225
1220
1215
E
F
G
H
2600
2800
3000
3200
3400
360
1



DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
OSS SECTION
THROUGH X 1,470 1
THROUGH AK 2,000 1
THROUGH X 1,230 2
THROUGH AK 1,520 2
THROUGH AK 760 10
TION OF THE FLOW IN COPPEI CREEK UPSTREAM
E HIGHWAY 12 BRIDGE FLOWS NORTH TO THE
ET RIVER. THIS CAUSES FLOW REDUCTION AS
ABOVE.
H
I
3000
3200
3400
3600
3800
4000
4200
4400
STREAM DISTANCE IN FEET



FLOOD PROFILES

MARCH 2001

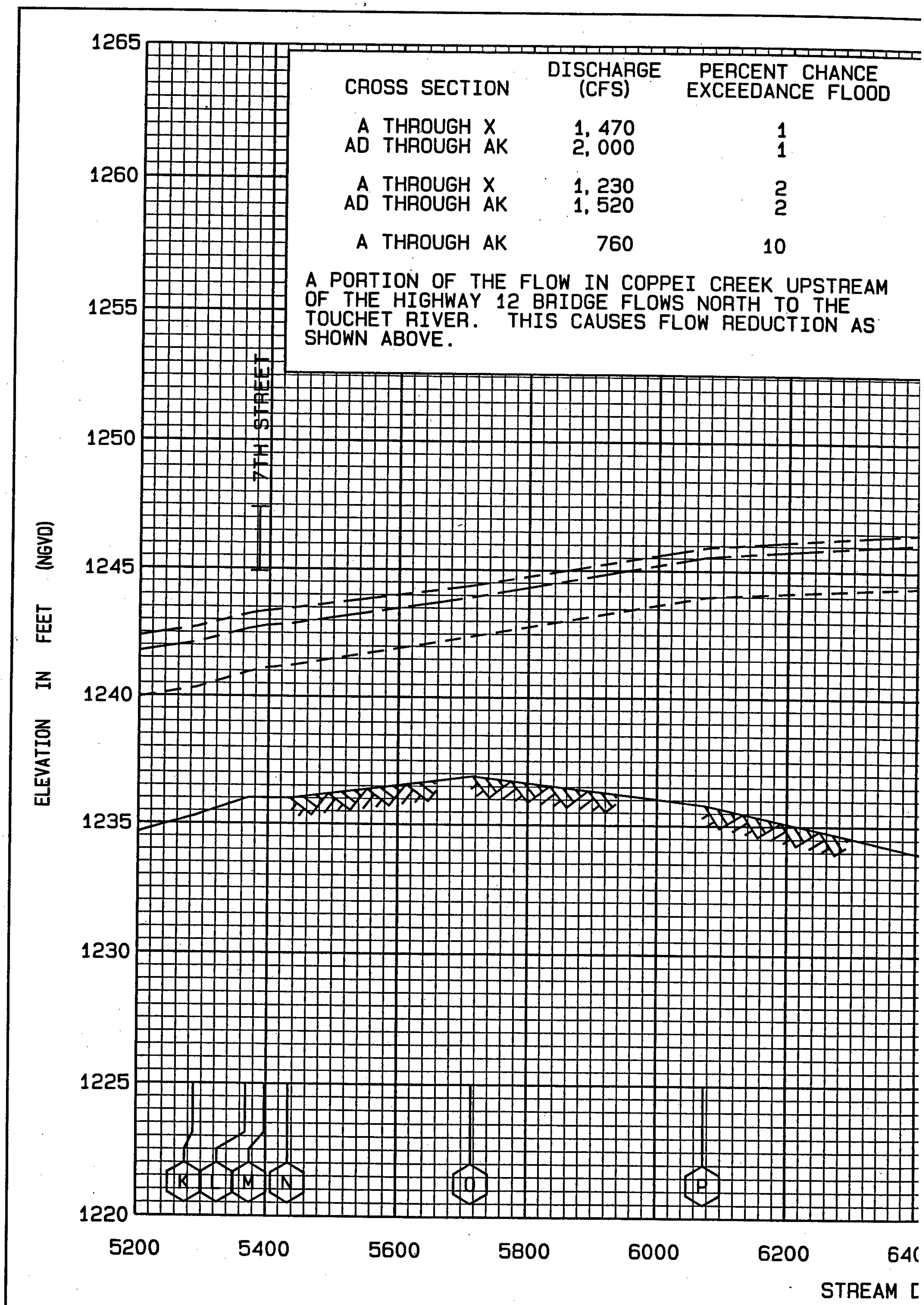
COPPEI CREEK

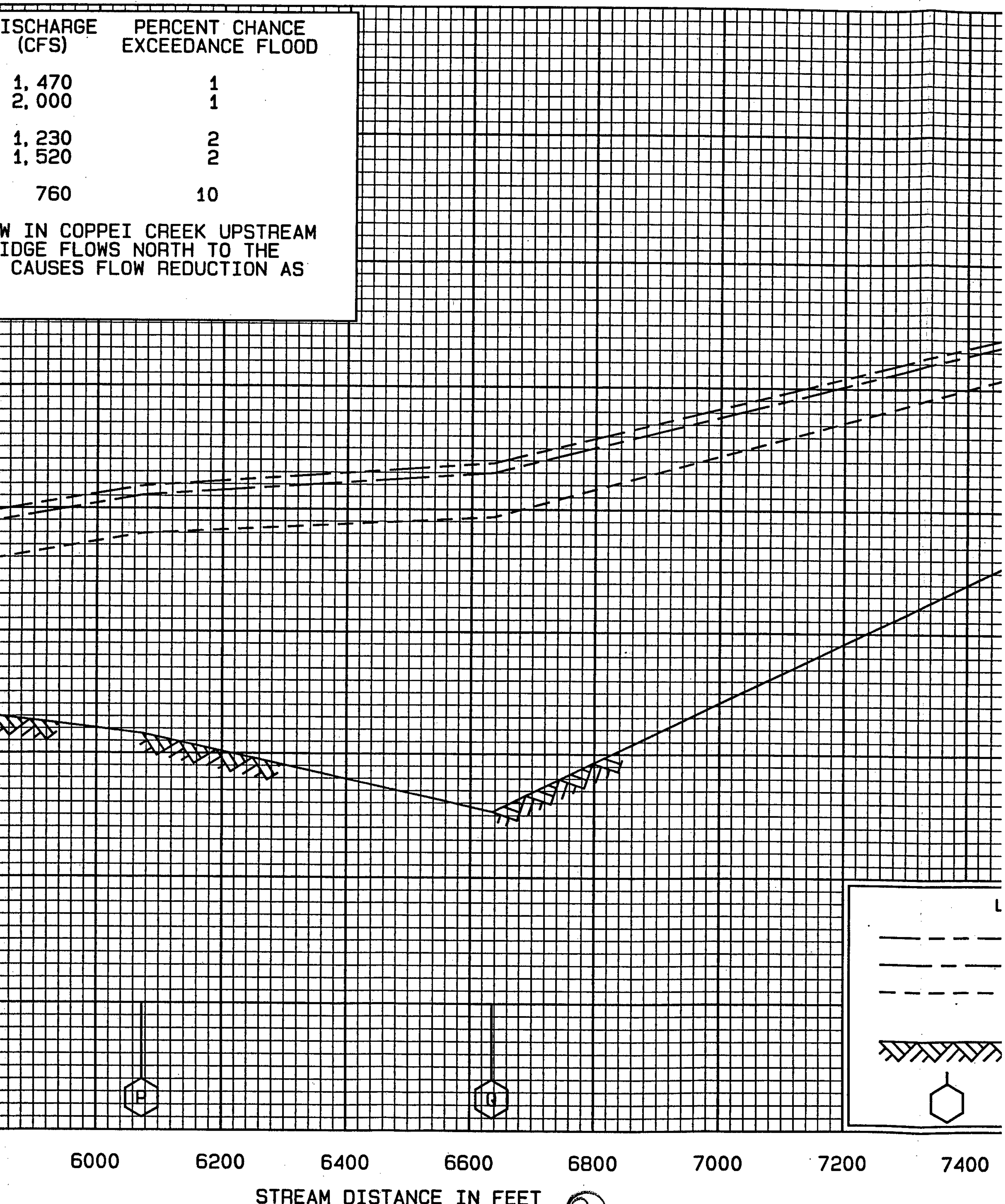
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON

WALLA WALLA COUNTY

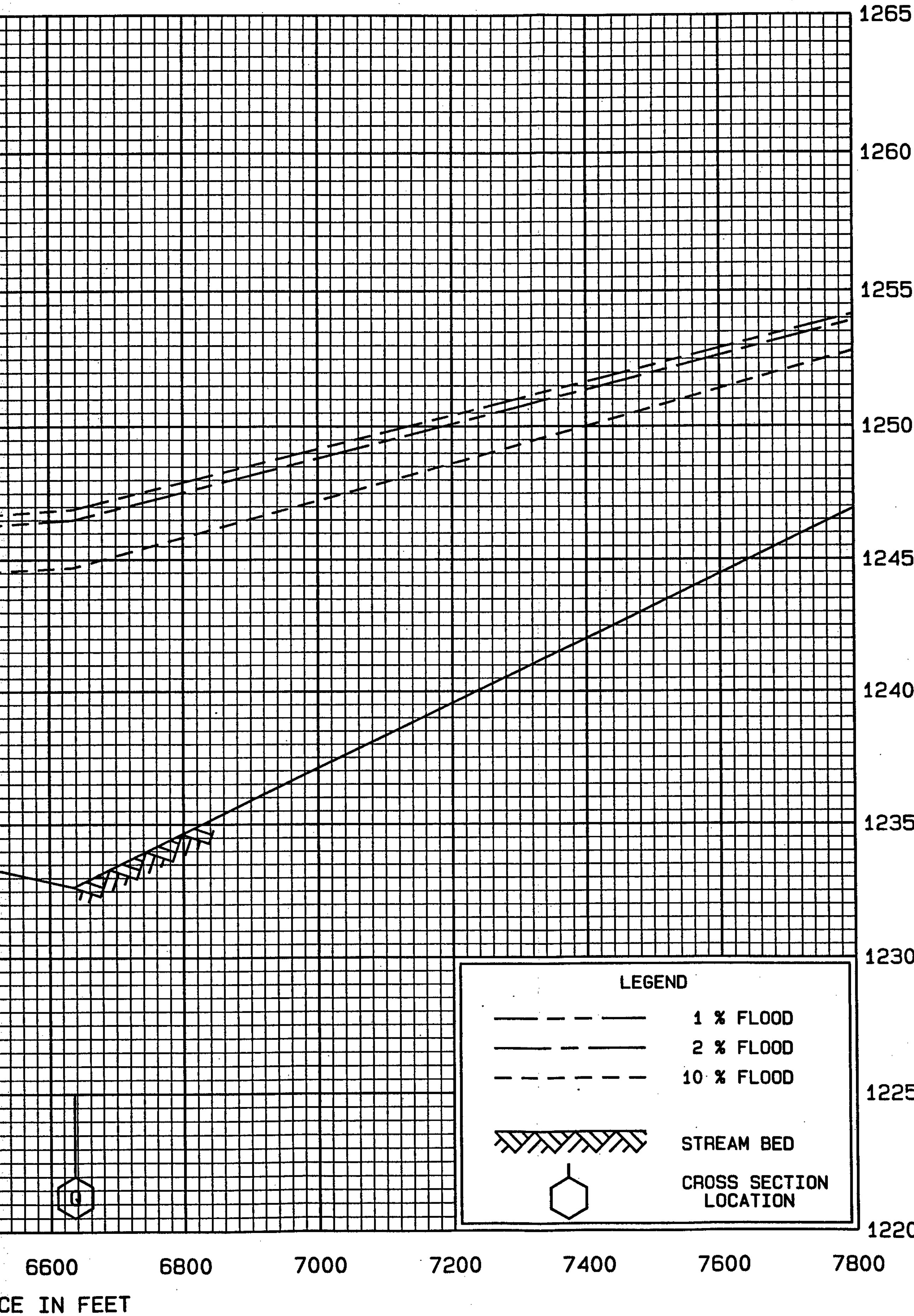
PLATE 2


CROSS SECTION
DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
A THROUGH X 1,470 1
AD THROUGH AK 2,000 1
A THROUGH X 1,230 2
AD THROUGH AK 1,520 2
A THROUGH AK 760 10
A PORTION OF THE FLOW IN COPPEI CREEK UPSTREAM OF THE HIGHWAY 12 BRIDGE FLOWS NORTH TO THE TOUCHET RIVER. THIS CAUSES FLOW REDUCTION AS SHOWN ABOVE.
7TH STREET
ELEVATION IN FEET (NGVD)
1265
1260
1255
1250
1245
1240
1235
1230
1225
1220
5200
5400
5600
5800
6000
6200
K
L
M
N
O
P



ISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
1,470 1
2,000 1
1,230 2
1,520 2
760 10
W IN COPPEI CREEK UPSTREAM
IDGE FLOWS NORTH TO THE
CAUSES FLOW REDUCTION AS
P
Q
6000
6200
6400
6600
6800
7000
7200
7400
STREAM DISTANCE IN FEET

(2)



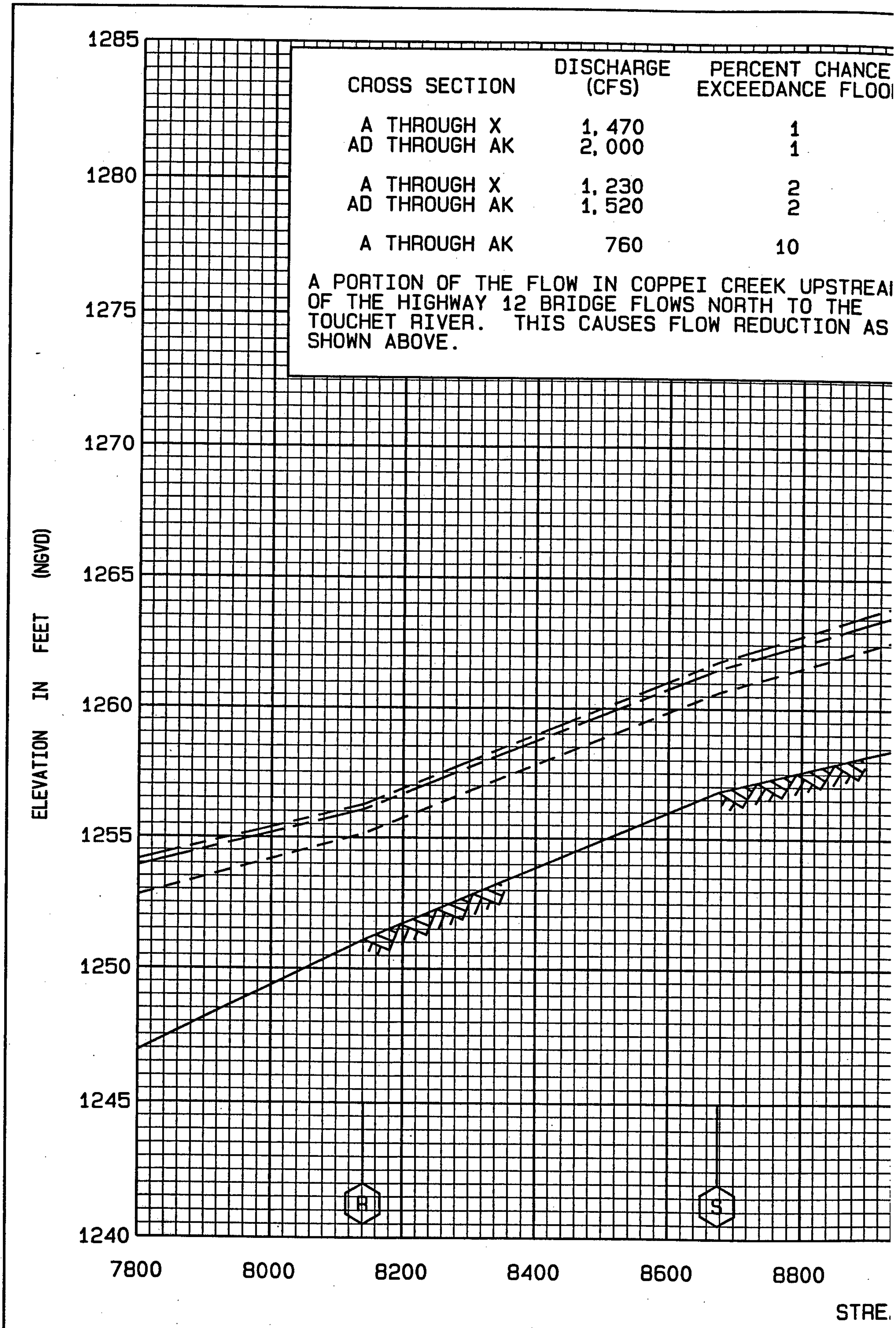
FLOOD PROFILES MARCH 2001

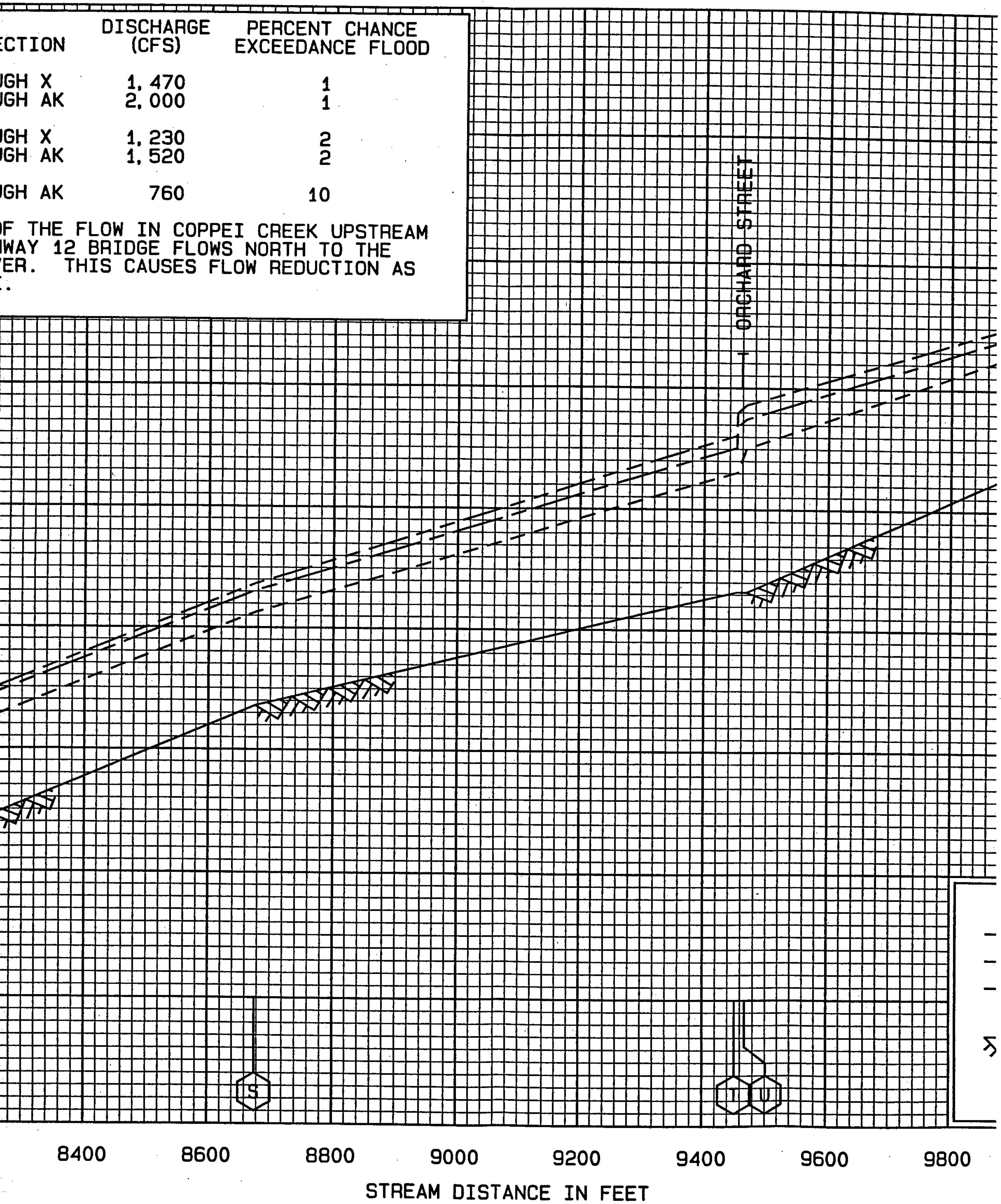
COPPEI CREEK

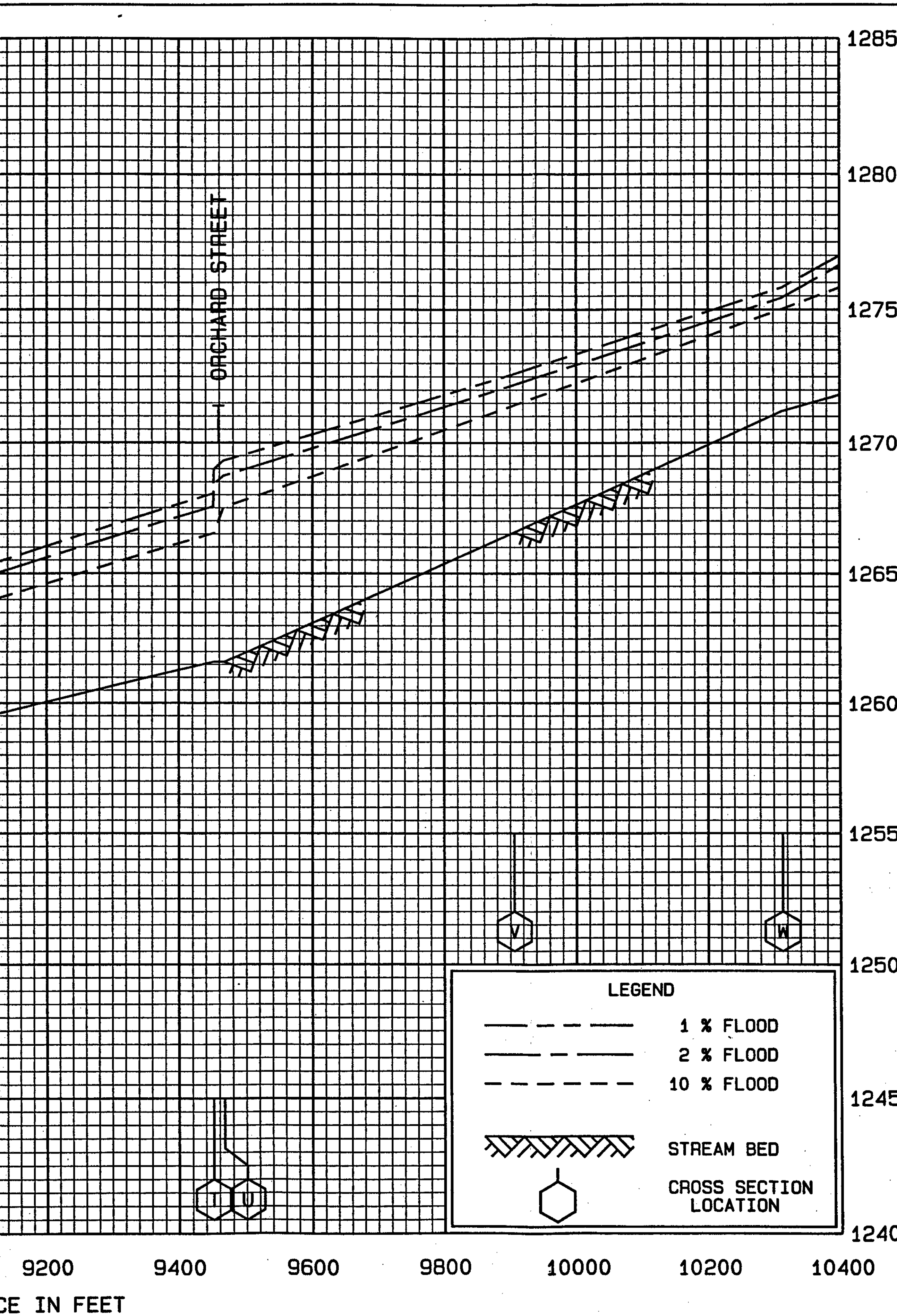
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 3


CROSS SECTION
DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOO
A THROUGH X 1,470 1
AD THROUGH AK 2,000 1
A THROUGH X 1,230 2
AD THROUGH AK 1,520 2
A THROUGH AK 760 10
A PORTION OF THE FLOW IN COPPEI CREEK UPSTREA
OF THE HIGHWAY 12 BRIDGE FLOWS NORTH TO THE
TOUCHET RIVER. THIS CAUSES FLOW REDUCTION AS
SHOWN ABOVE.
ELEVATION IN FEET (NGVD)
1285
1280
1275
1270
1265
1260
1255
1250
1245
1240
7800
8000
8200
8400
8600
8800
STRE
R
S


ECTION
DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
UGH X 1,470 1
UGH AK 2,000 1
UGH X 1,230 2
UGH AK 1,520 2
UGH AK 760 10
OF THE FLOW IN COPPEI CREEK UPSTREAM
WAY 12 BRIDGE FLOWS NORTH TO THE
VER. THIS CAUSES FLOW REDUCTION AS
ORCHARD STREET
S
T
U
8400
8600
8800
9000
9200
9400
9600
9800
STREAM DISTANCE IN FEET



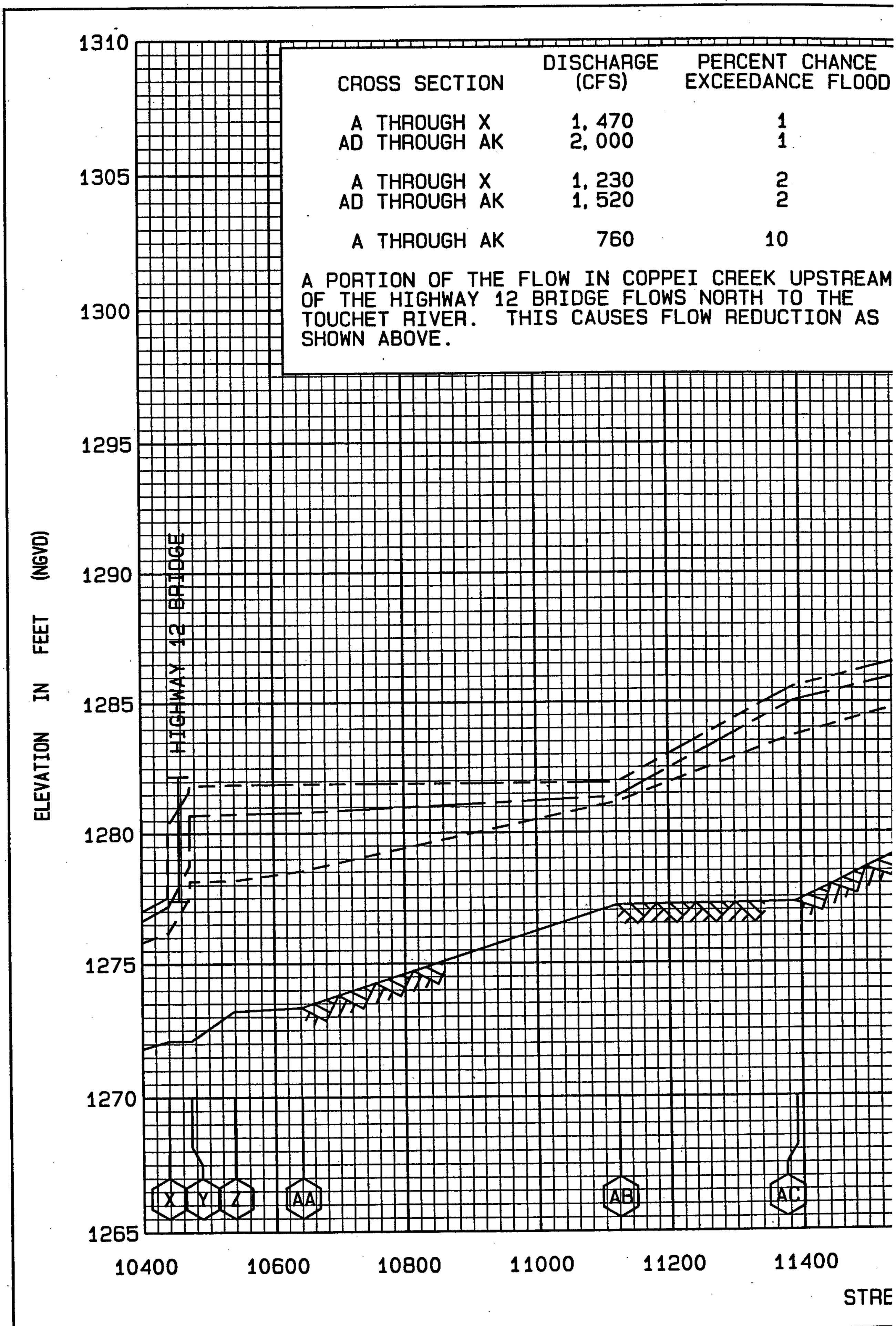
FLOOD PROFILES MARCH 2001

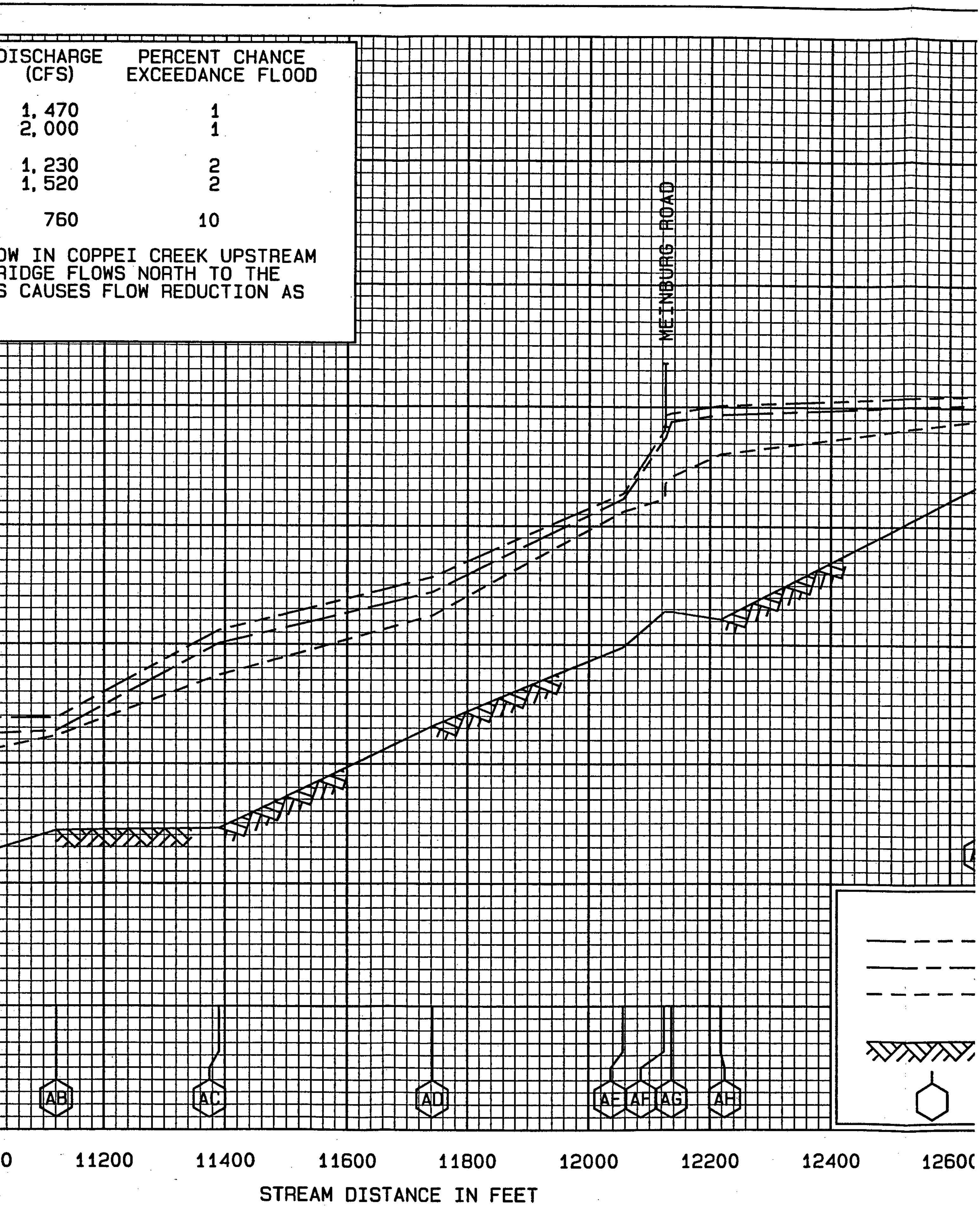
COPPEI CREEK

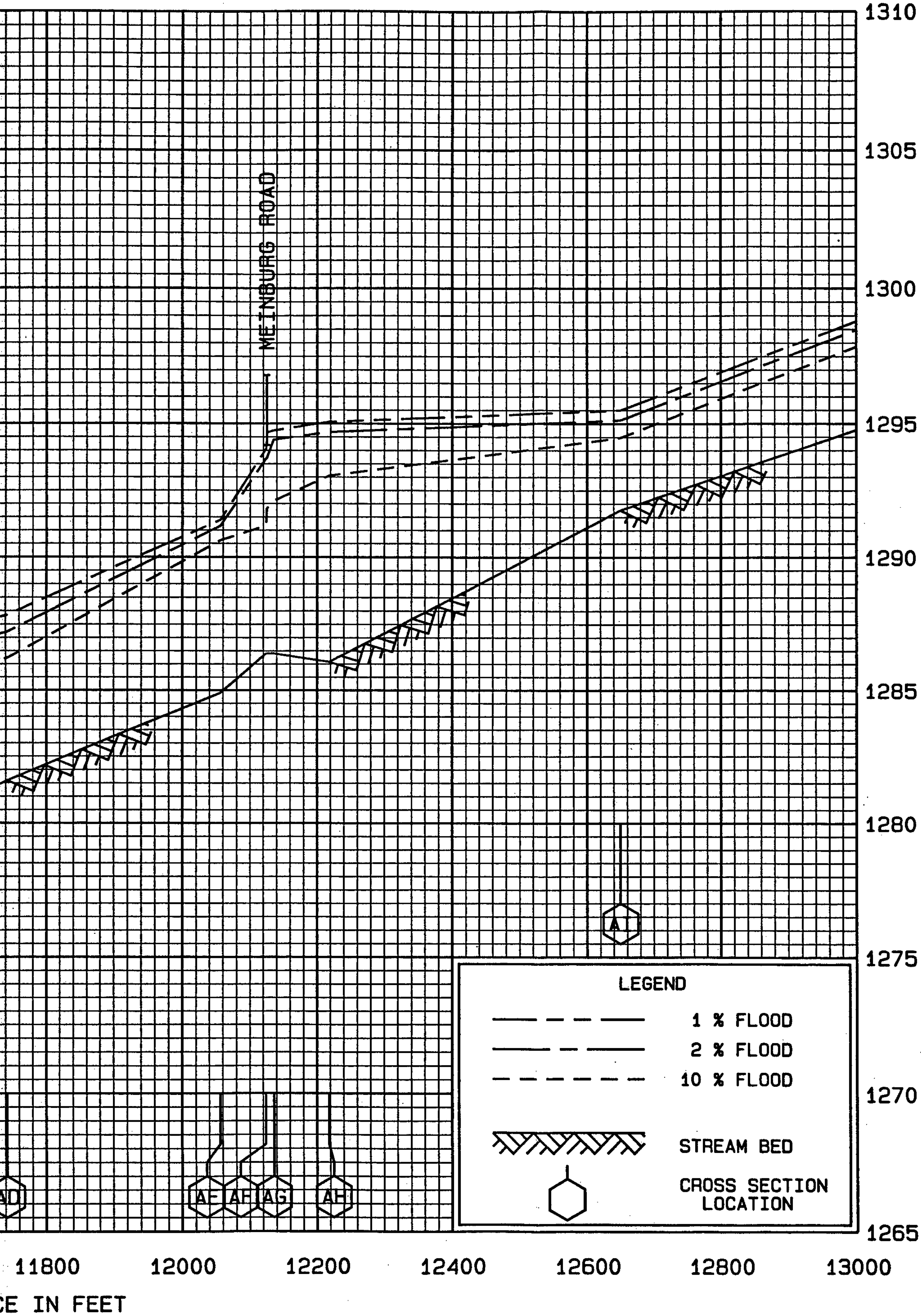
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 4


CROSS SECTION
DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
A THROUGH X 1,470 1
AD THROUGH AK 2,000 1
A THROUGH X 1,230 2
AD THROUGH AK 1,520 2
A THROUGH AK 760 10
A PORTION OF THE FLOW IN COPPEI CREEK UPSTREAM OF THE HIGHWAY 12 BRIDGE FLOWS NORTH TO THE TOUCHET RIVER. THIS CAUSES FLOW REDUCTION AS SHOWN ABOVE.
HIGHWAY 12 BRIDGE
ELEVATION IN FEET (NGVD)
1310
1305
1300
1295
1290
1285
1280
1275
1270
1265
X
Y
Z
AA
AB
AC
10400
10600
10800
11000
11200
11400
STRE


DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
1,470 1
2,000 1
1,230 2
1,520 2
760 10
OW IN COPPEI CREEK UPSTREAM
RIDGE FLOWS NORTH TO THE
S CAUSES FLOW REDUCTION AS
MEINBURG ROAD
AB
AC
AD
AF
AF
AG
AH
11200
11400
11600
11800
12000
12200
12400
STREAM DISTANCE IN FEET



FLOOD PROFILES

MARCH 2001

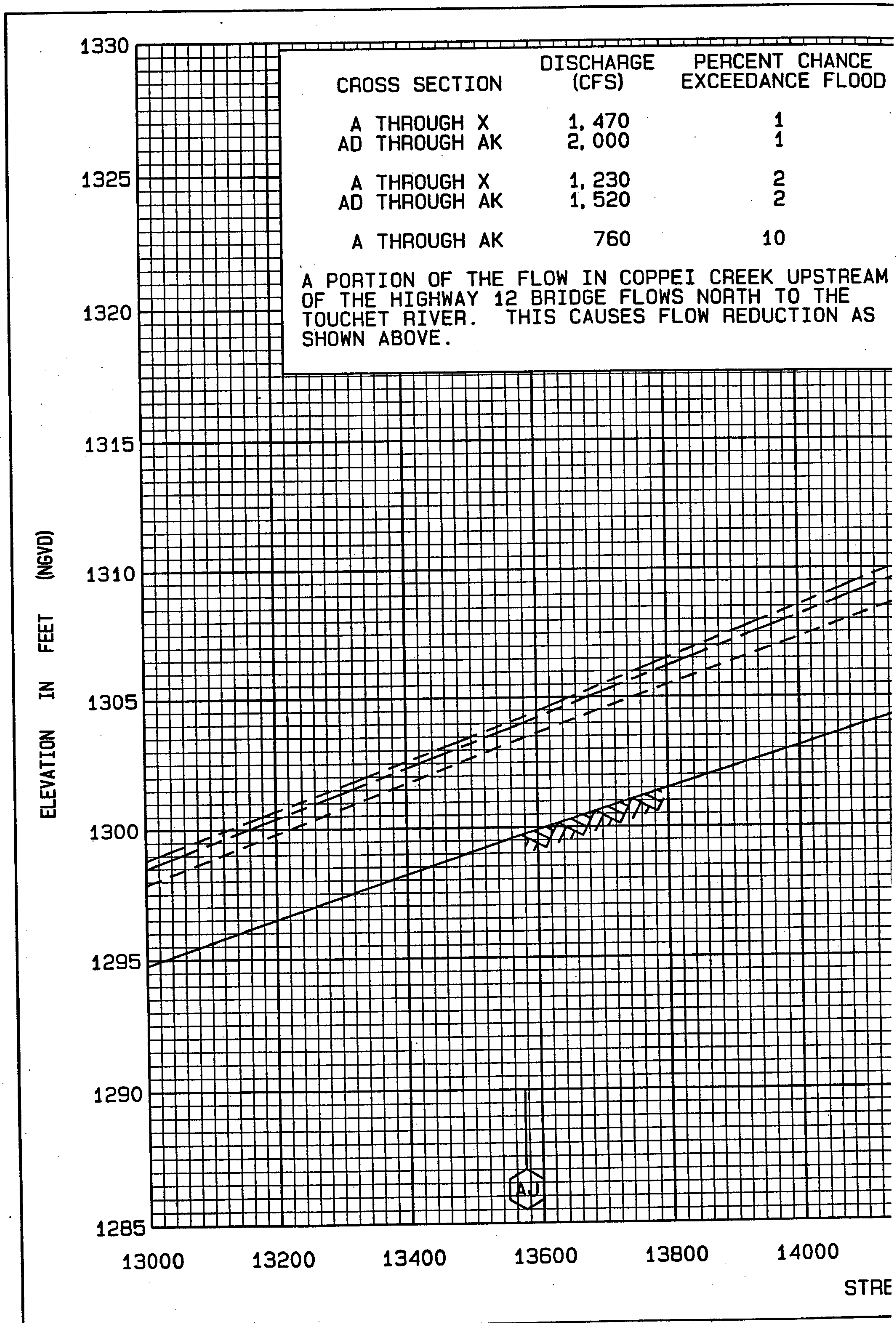
COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

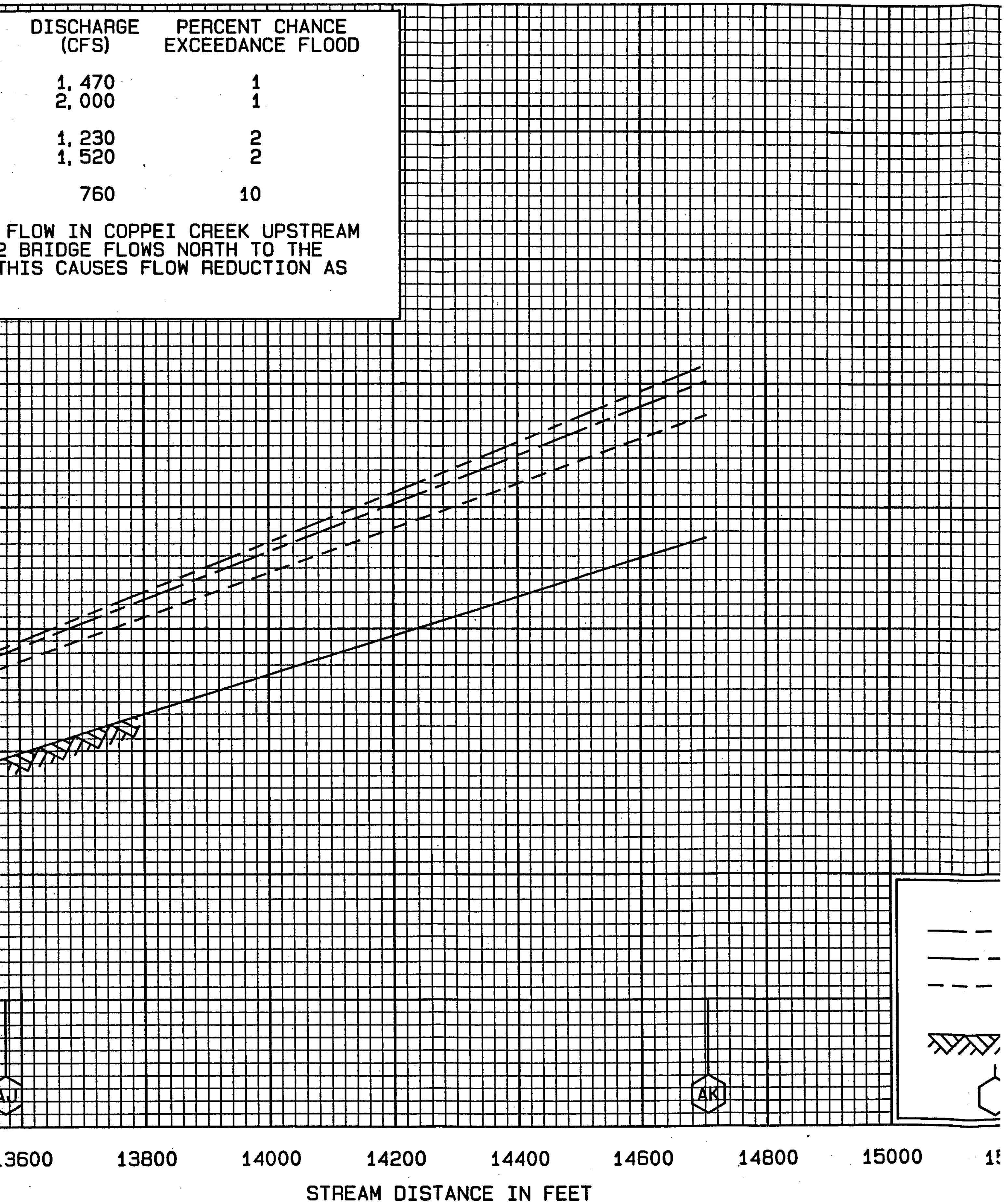
PLATE 5

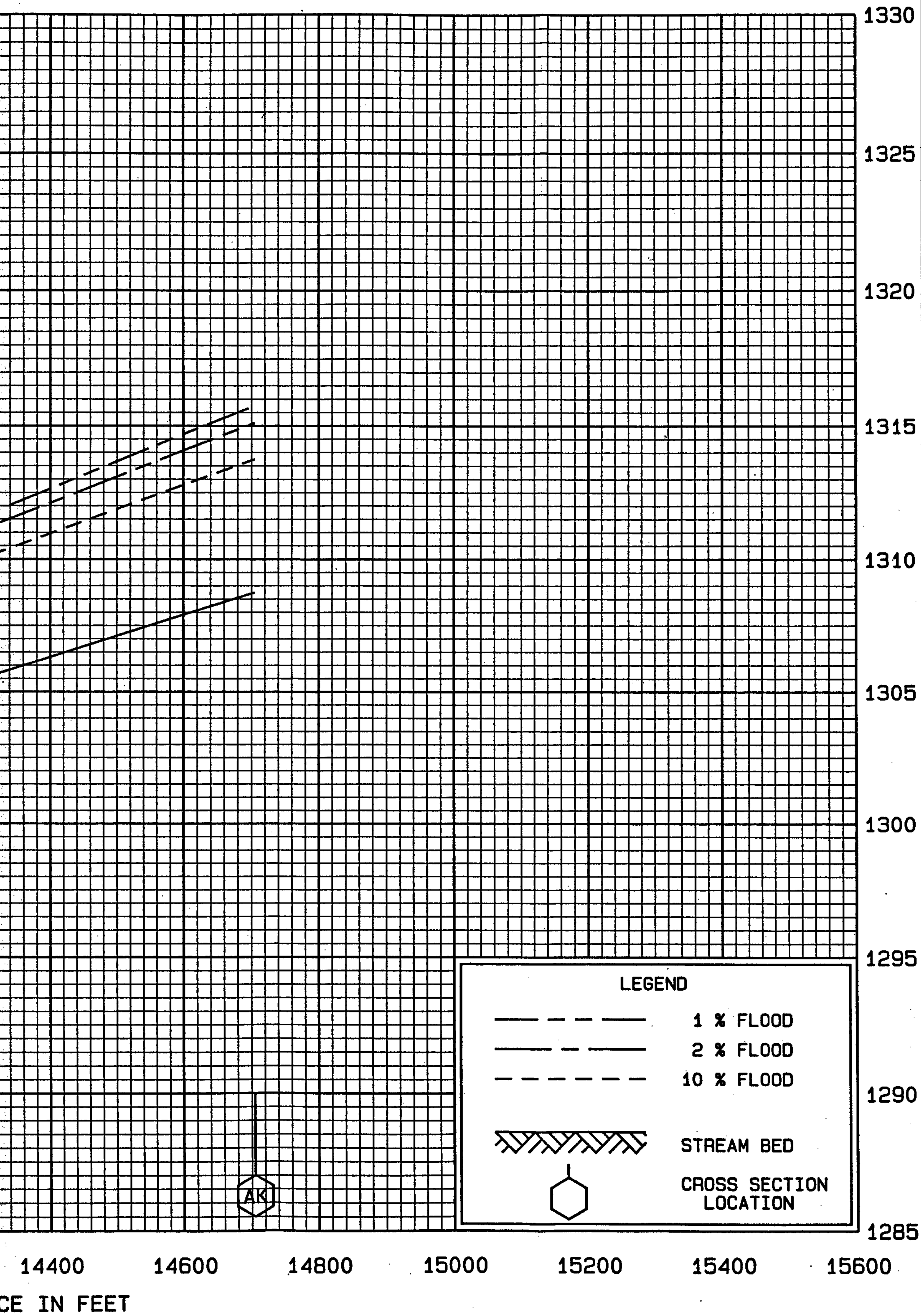
3



CROSS SECTION
DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
A THROUGH X 1,470 1
AD THROUGH AK 2,000 1
A THROUGH X 1,230 2
AD THROUGH AK 1,520 2
A THROUGH AK 760 10
A PORTION OF THE FLOW IN COPPEI CREEK UPSTREAM OF THE HIGHWAY 12 BRIDGE FLOWS NORTH TO THE TOUCHET RIVER. THIS CAUSES FLOW REDUCTION AS SHOWN ABOVE.
ELEVATION IN FEET (NGVD)
1330
1325
1320
1315
1310
1305
1300
1295
1290
1285
13000
13200
13400
13600
13800
14000
STRE
AJ

(1)


DISCHARGE (CFS)
PERCENT CHANCE EXCEEDANCE FLOOD
1, 470 1
2, 000 1
1, 230 2
1, 520 2
760 10
FLOW IN COPPEI CREEK UPSTREAM
2 BRIDGE FLOWS NORTH TO THE
THIS CAUSES FLOW REDUCTION AS
AJ
AK
.3600
13800
14000
14200
14400
14600
14800
15000
STREAM DISTANCE IN FEET



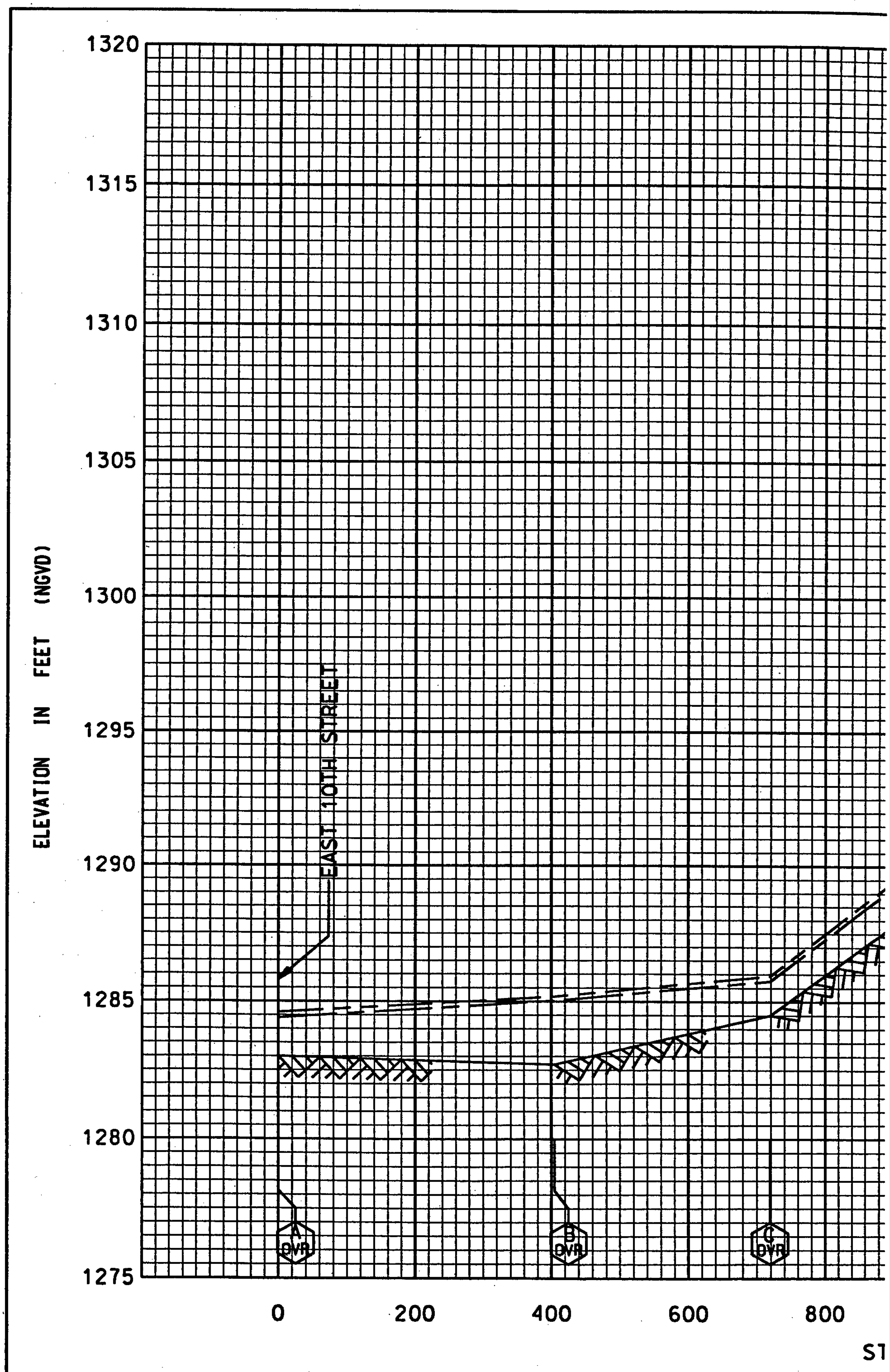
FLOOD PROFILES
MARCH 2001

COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

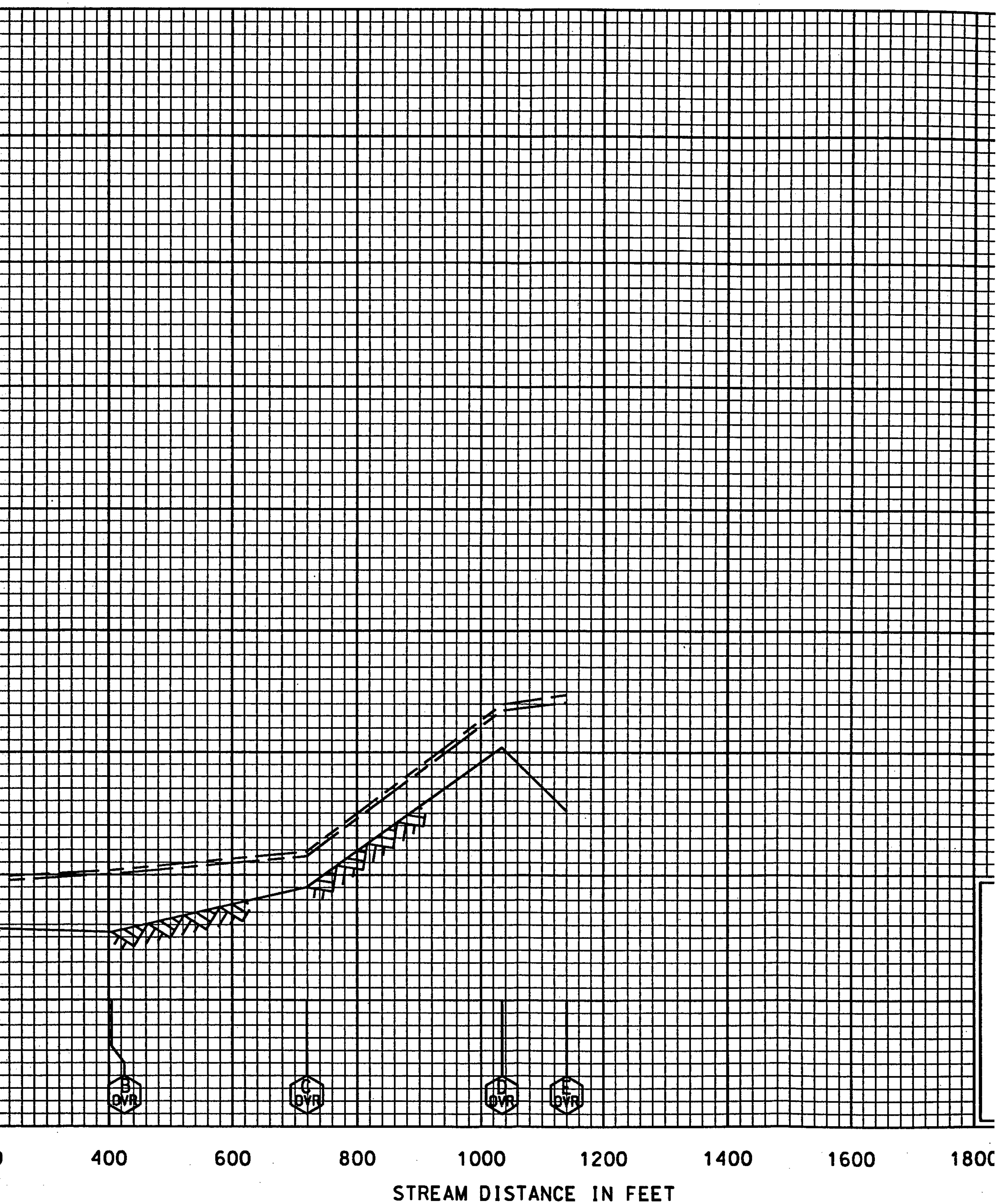
WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 6



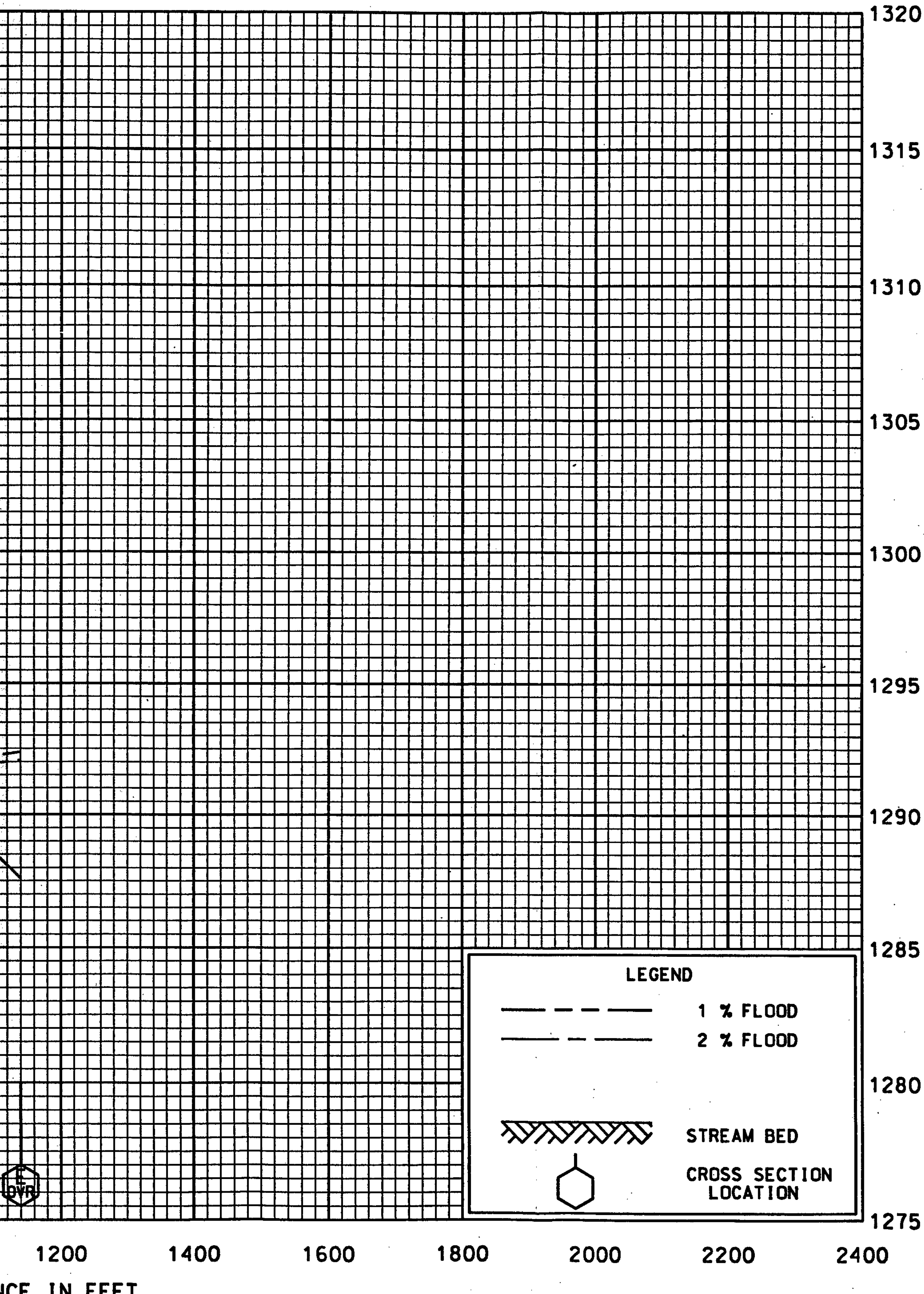
ELEVATION IN FEET (NGVD)
1320
1315
1310
1305
1300
1295
1290
1285
1280
1275
EAST 10TH STREET
A
DVR
B
DVR
C
DVR
0
200
400
600
800
ST

1



B
DVR
C
DVR
D
DVR
E
DVR
400
600
800
1000
1200
1400
1600
1800
STREAM DISTANCE IN FEET

2



A00705

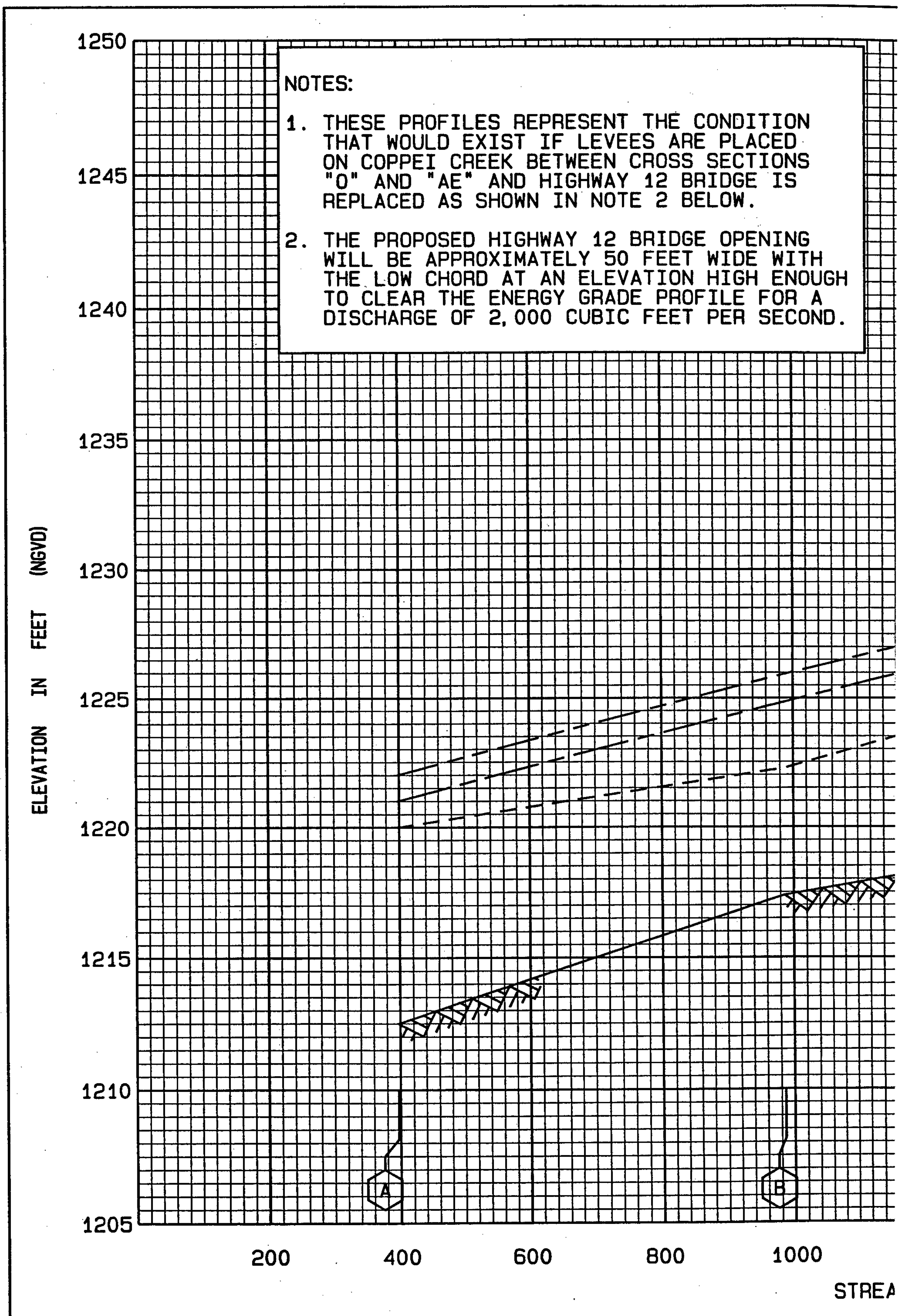
FLOOD PROFILES MAR 2001

COPPEI CREEK OVERFLOW

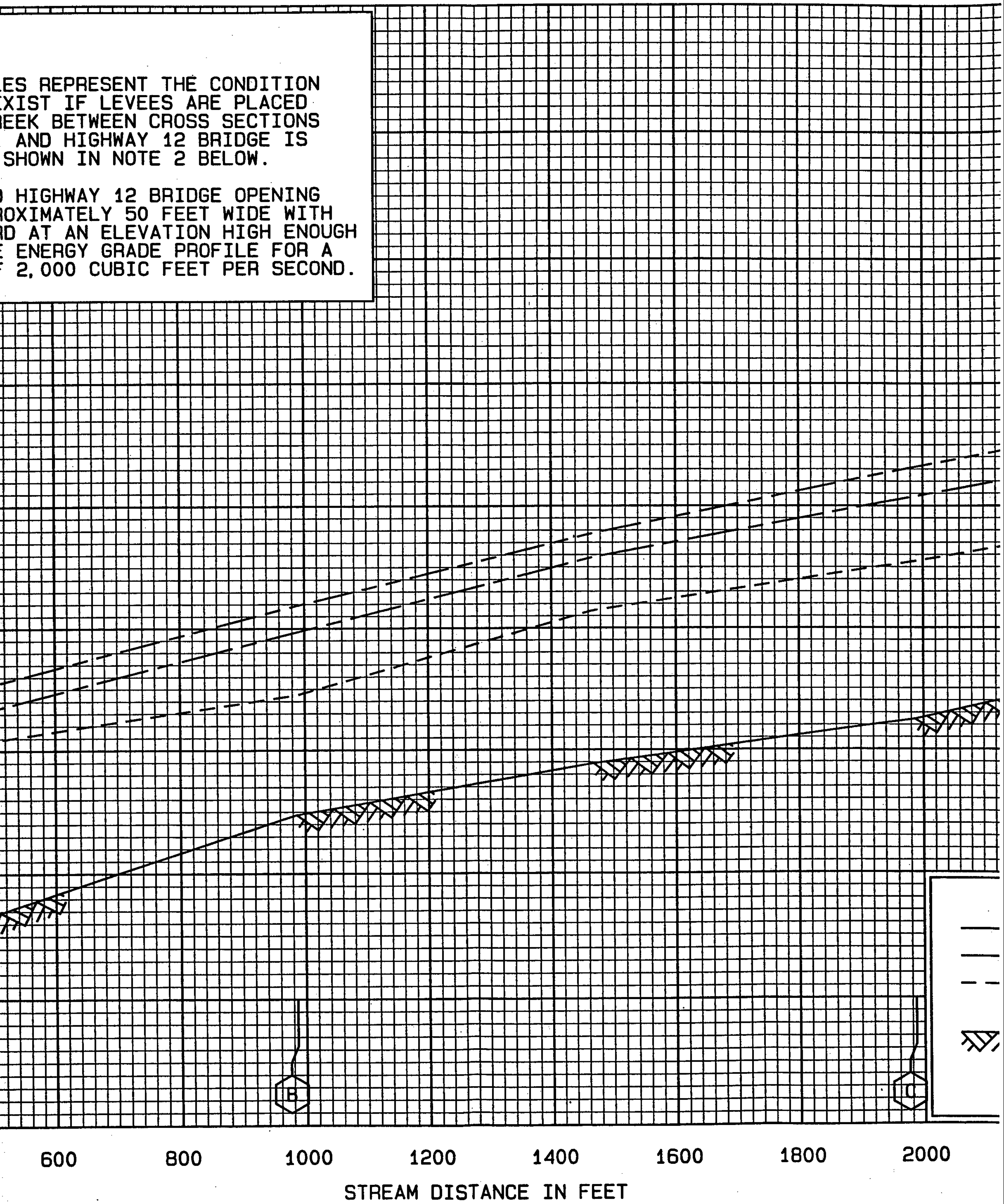
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

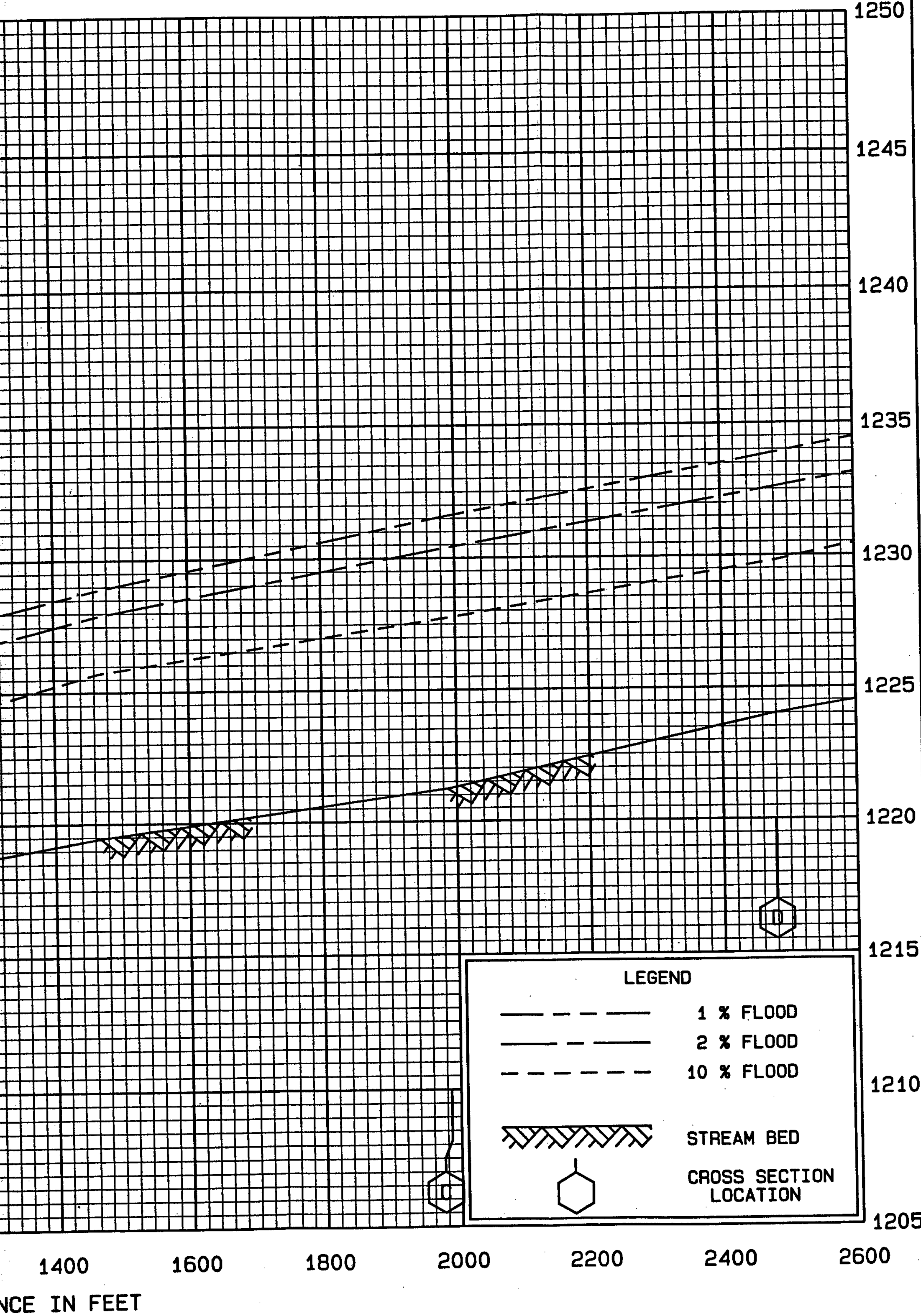
WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 7



NOTES:
1. THESE PROFILES REPRESENT THE CONDITION THAT WOULD EXIST IF LEVEES ARE PLACED ON COPPEI CREEK BETWEEN CROSS SECTIONS "O" AND "AE" AND HIGHWAY 12 BRIDGE IS REPLACED AS SHOWN IN NOTE 2 BELOW.
2. THE PROPOSED HIGHWAY 12 BRIDGE OPENING WILL BE APPROXIMATELY 50 FEET WIDE WITH THE LOW CHORD AT AN ELEVATION HIGH ENOUGH TO CLEAR THE ENERGY GRADE PROFILE FOR A DISCHARGE OF 2,000 CUBIC FEET PER SECOND.
ELEVATION IN FEET (NGVD)
1250
1245
1240
1235
1230
1225
1220
1215
1210
1205
A
B
200
400
600
800
1000
STREA


ES REPRESENT THE CONDITION
XIST IF LEVEES ARE PLACED
EEK BETWEEN CROSS SECTIONS
AND HIGHWAY 12 BRIDGE IS
SHOWN IN NOTE 2 BELOW.
HIGHWAY 12 BRIDGE OPENING
OXIMATELY 50 FEET WIDE WITH
RD AT AN ELEVATION HIGH ENOUGH
E ENERGY GRADE PROFILE FOR A
F 2,000 CUBIC FEET PER SECOND.
B
C
600
800
1000
1200
1400
1600
1800
2000
STREAM DISTANCE IN FEET



FLOOD PROFILES

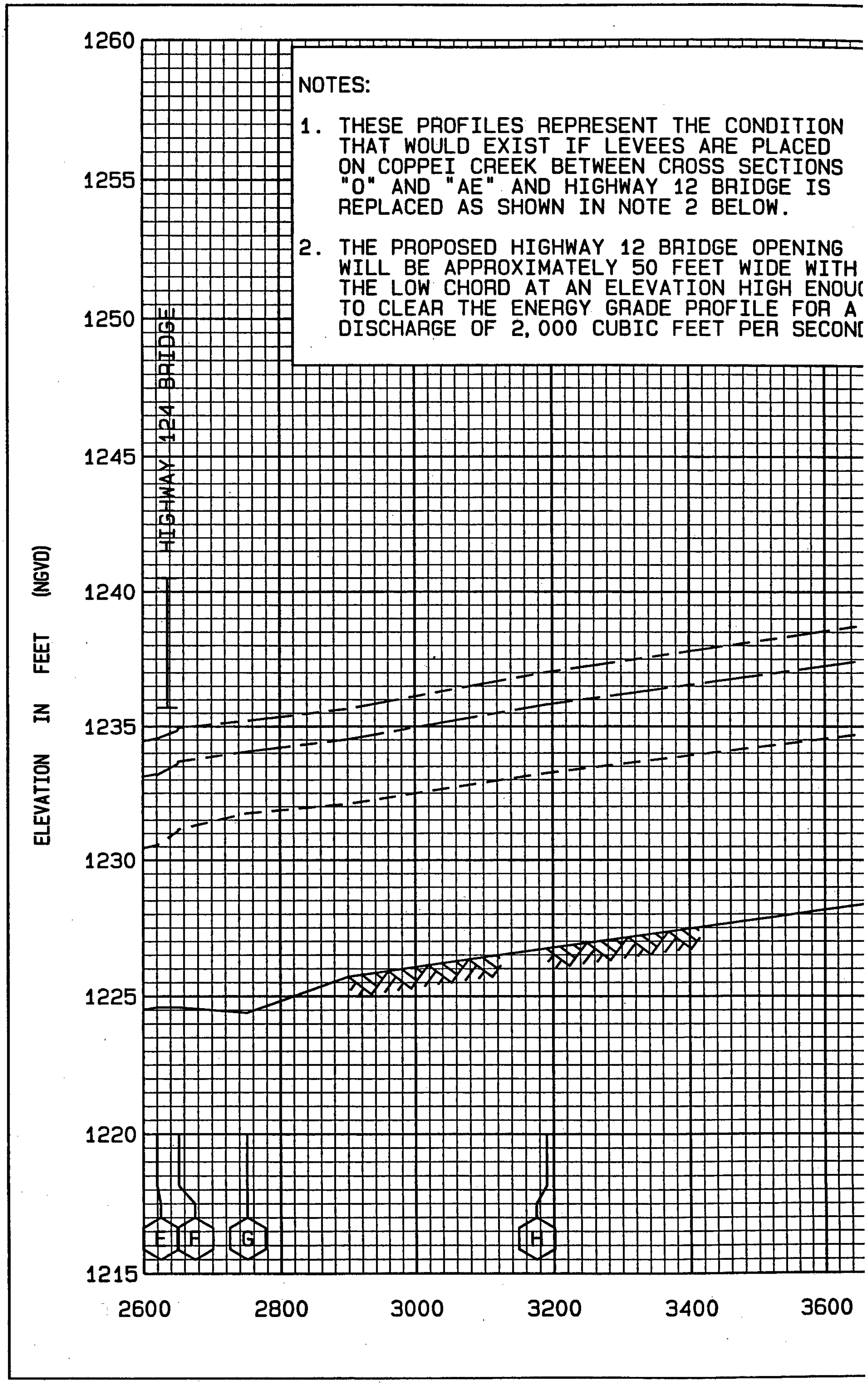
MARCH 2001

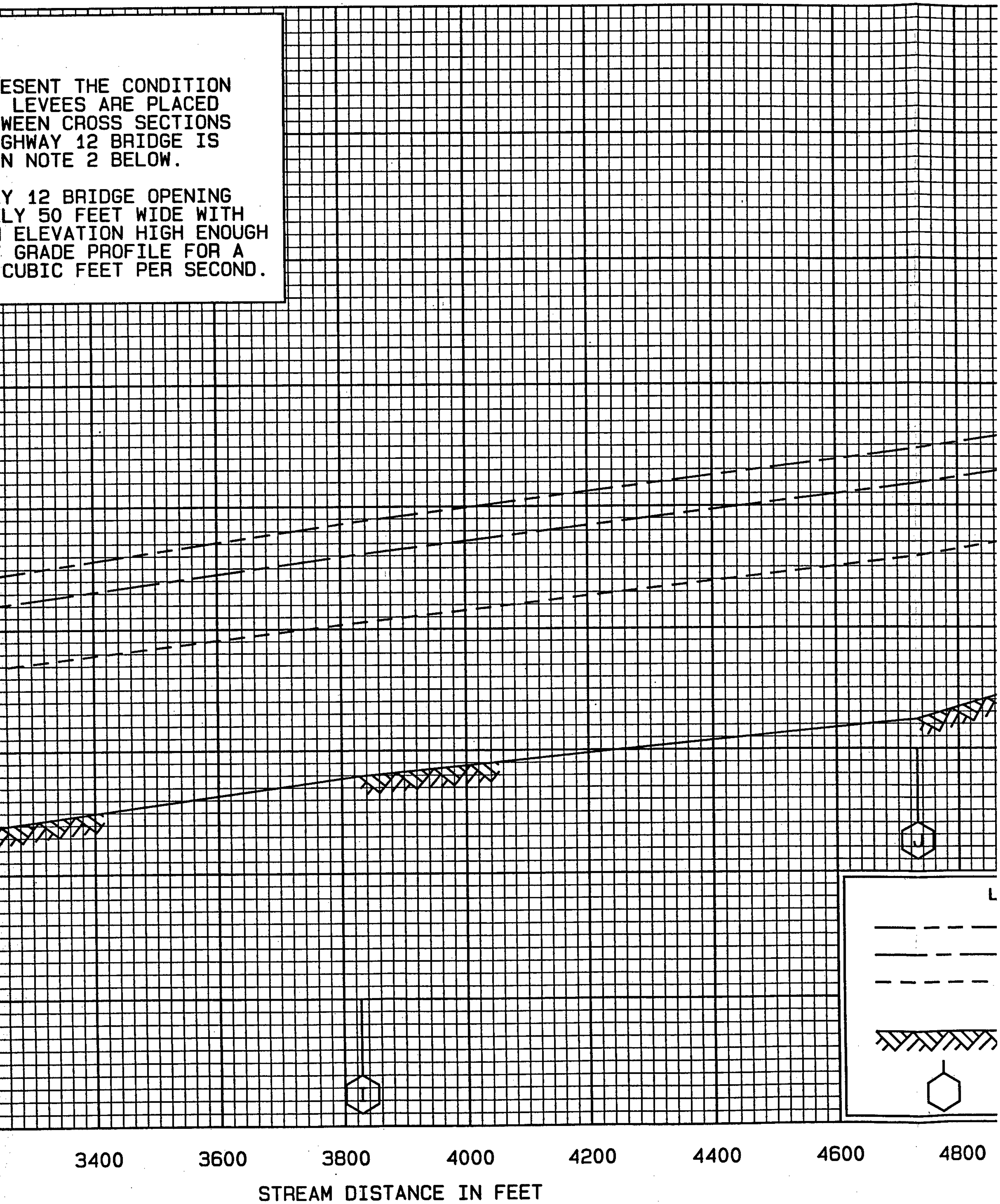
COPPEI CREEK

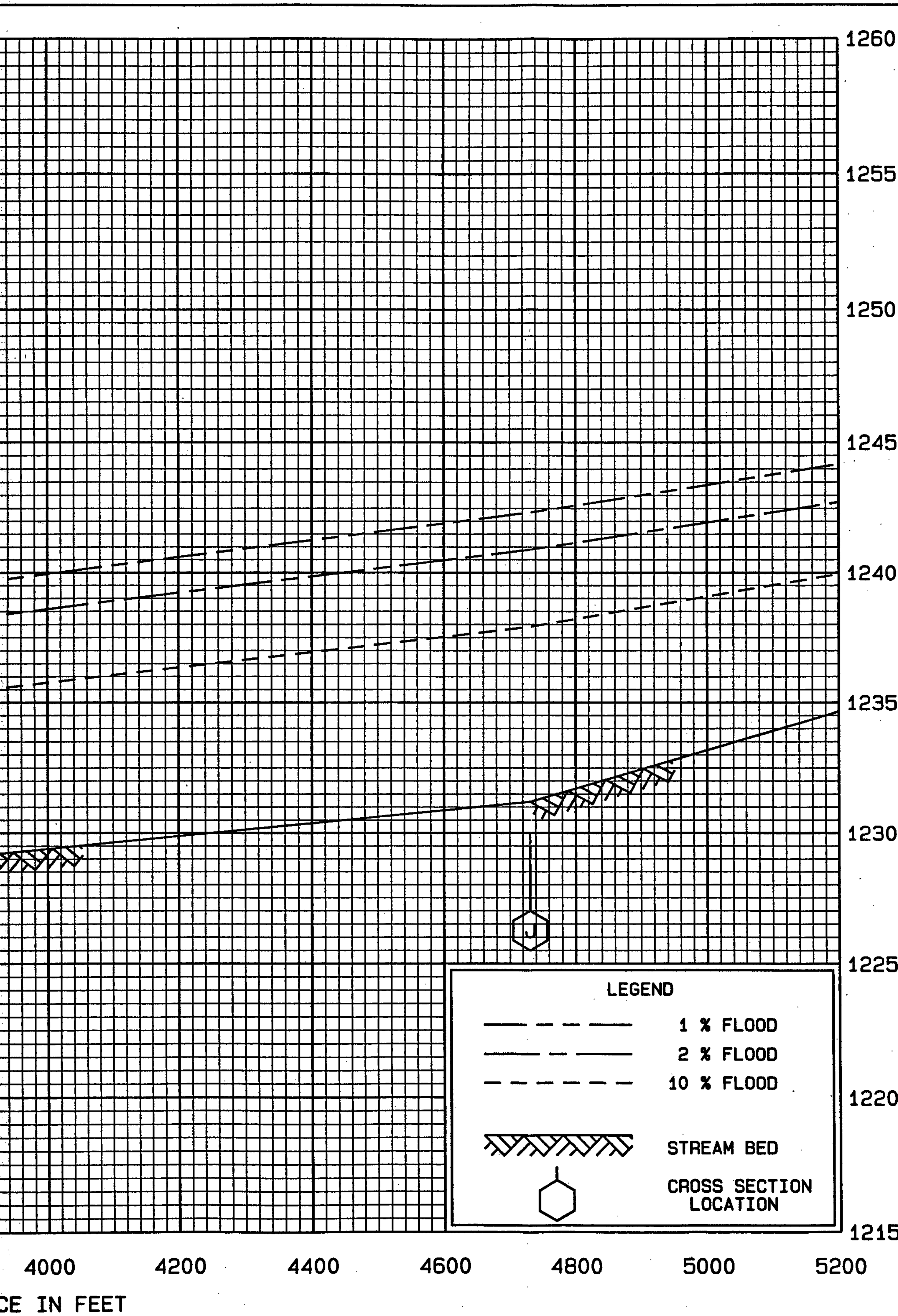
U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 8


NOTES:
1. THESE PROFILES REPRESENT THE CONDITION THAT WOULD EXIST IF LEVEES ARE PLACED ON COPPEI CREEK BETWEEN CROSS SECTIONS "O" AND "AE" AND HIGHWAY 12 BRIDGE IS REPLACED AS SHOWN IN NOTE 2 BELOW.
2. THE PROPOSED HIGHWAY 12 BRIDGE OPENING WILL BE APPROXIMATELY 50 FEET WIDE WITH THE LOW CHORD AT AN ELEVATION HIGH ENOU THE ENERGY GRADE PROFILE FOR A DISCHARGE OF 2,000 CUBIC FEET PER SECON
HIGHWAY 124 BRIDGE
ELEVATION IN FEET (NGVD)
1260
1255
1250
1245
1240
1235
1230
1225
1220
1215
2600
2800
3000
3200
3400
3600
E
F
G
H


ESENT THE CONDITION
LEVEES ARE PLACED
WEEN CROSS SECTIONS
GHWAY 12 BRIDGE IS
N NOTE 2 BELOW.
Y 12 BRIDGE OPENING
LY 50 FEET WIDE WITH
ELEVATION HIGH ENOUGH
GRADE PROFILE FOR A
CUBIC FEET PER SECOND.
I
J
L
3400
3600
3800
4000
4200
4400
4600
4800
STREAM DISTANCE IN FEET



FLOOD PROFILES MARCH 2001

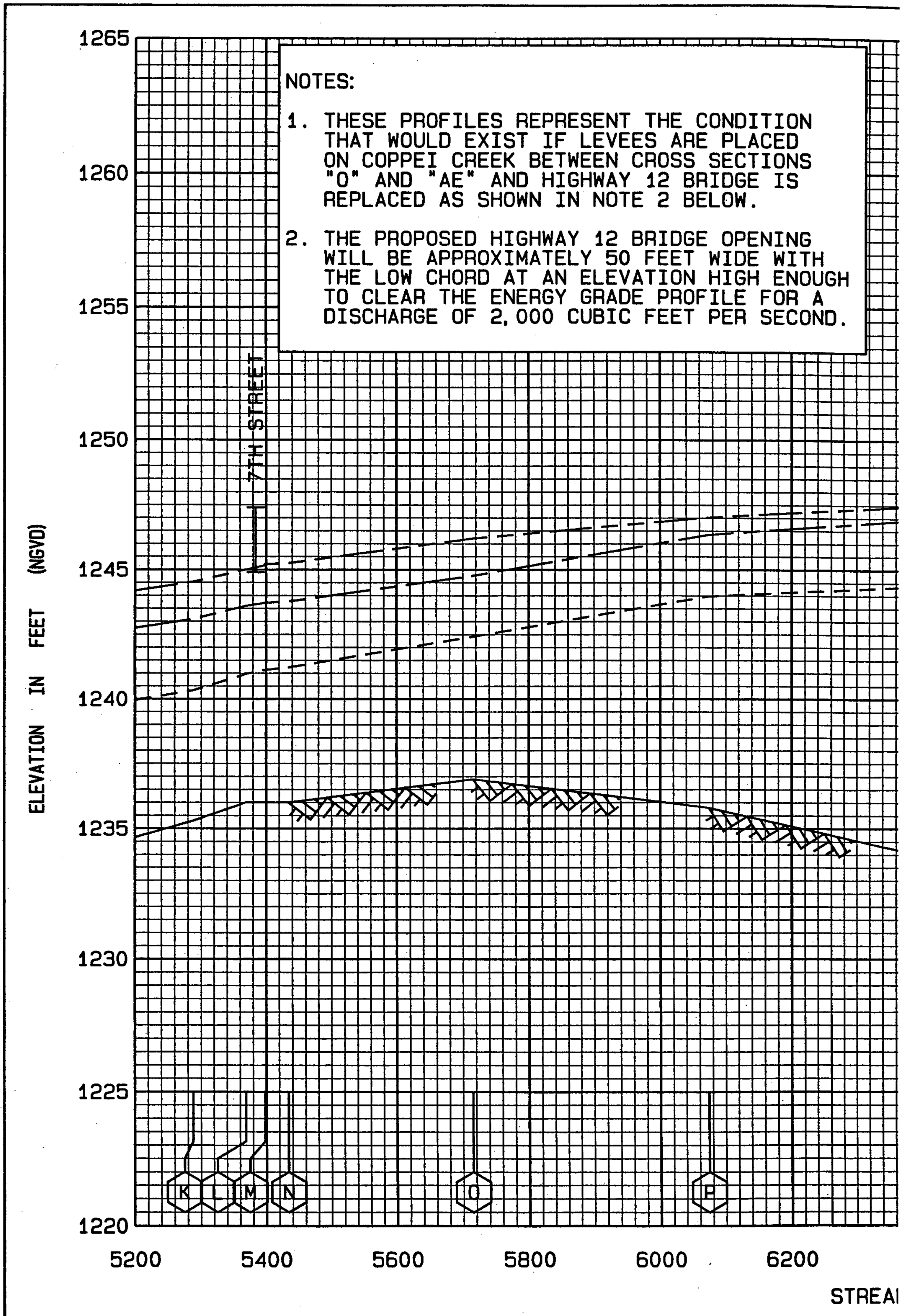
COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

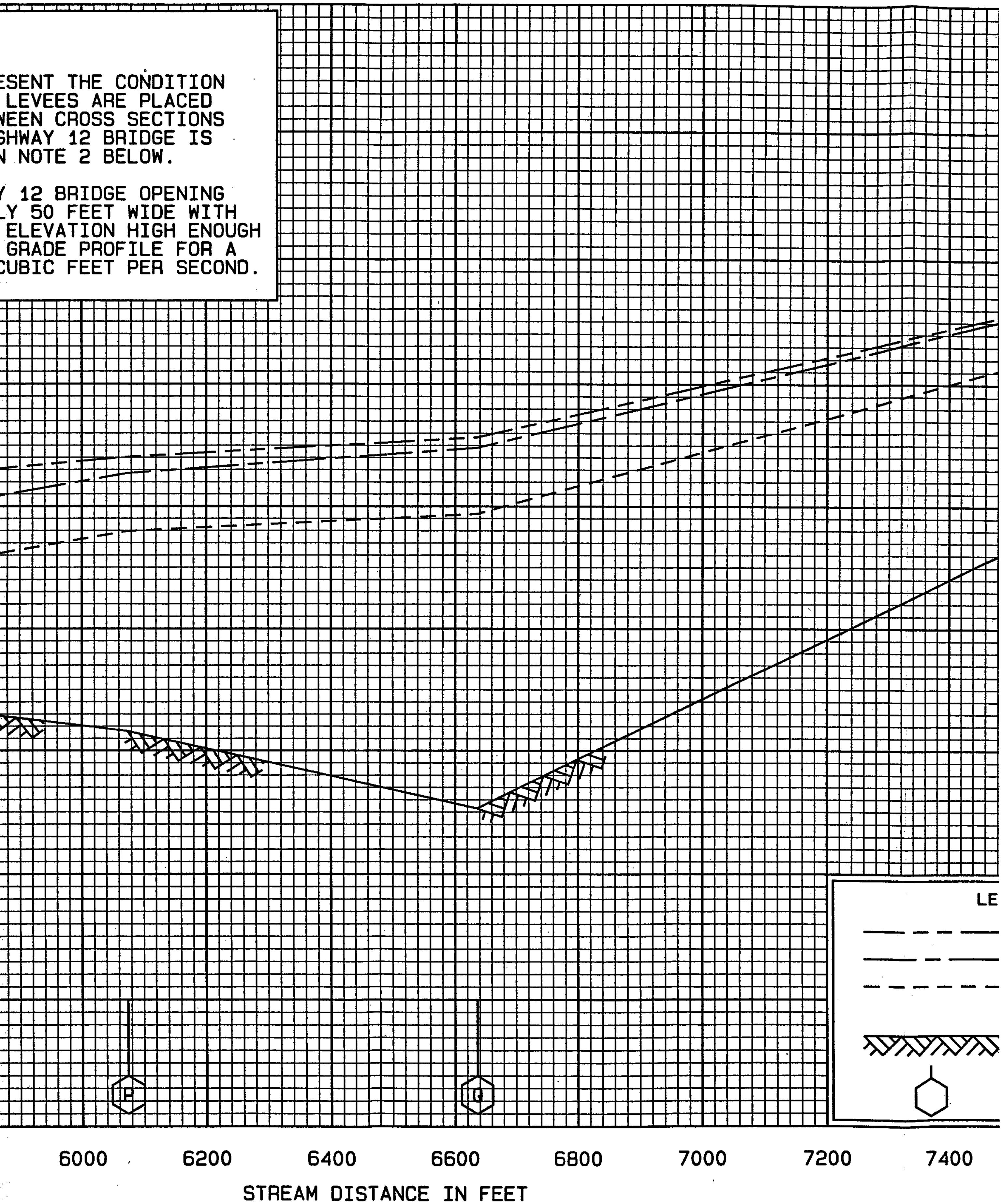
WAITSBURG, WASHINGTON

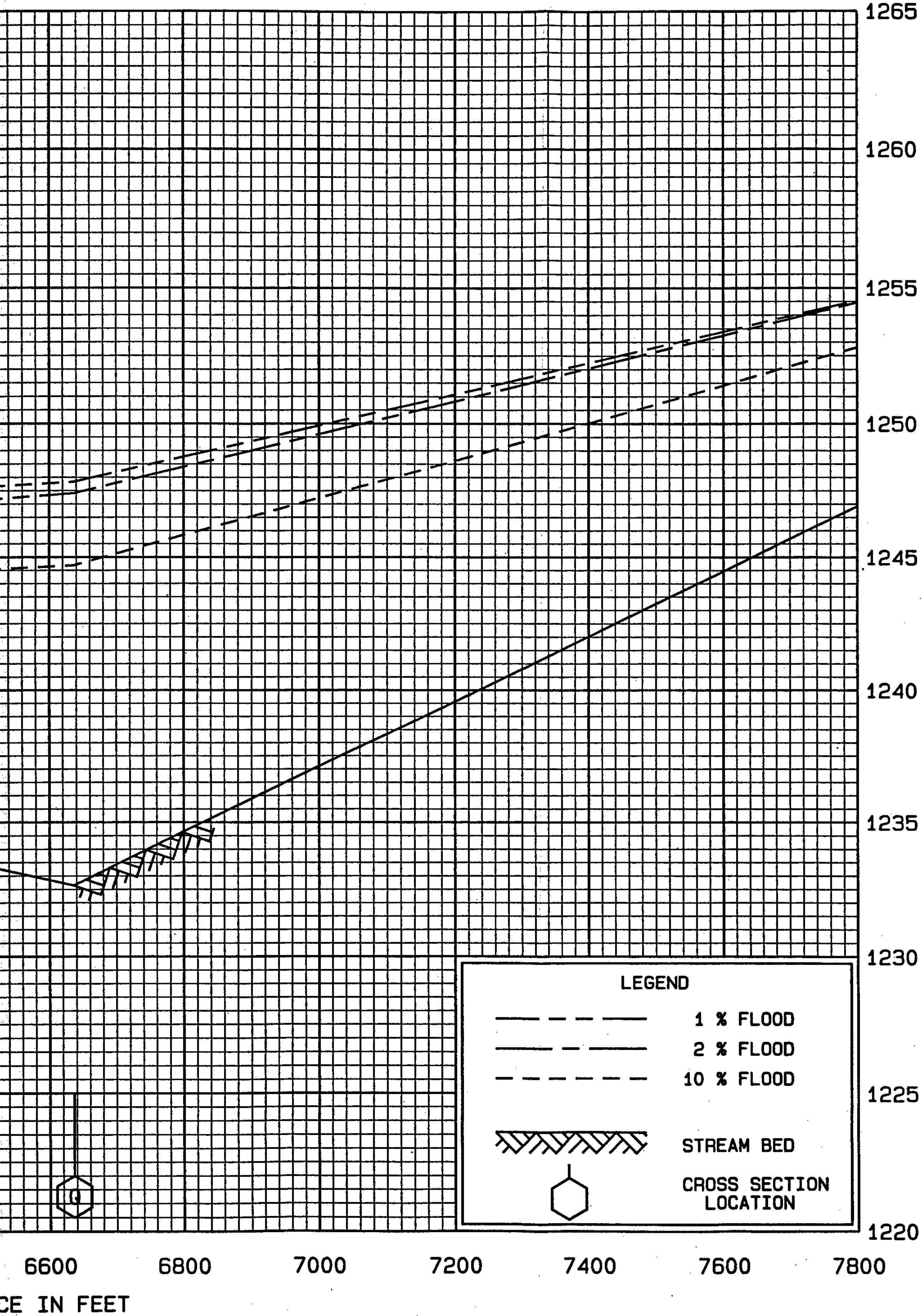
WALLA WALLA COUNTY

PLATE 9


NOTES:
1. THESE PROFILES REPRESENT THE CONDITION THAT WOULD EXIST IF LEVEES ARE PLACED ON COPPEI CREEK BETWEEN CROSS SECTIONS "O" AND "AE" AND HIGHWAY 12 BRIDGE IS REPLACED AS SHOWN IN NOTE 2 BELOW.
2. THE PROPOSED HIGHWAY 12 BRIDGE OPENING WILL BE APPROXIMATELY 50 FEET WIDE WITH THE LOW CHORD AT AN ELEVATION HIGH ENOUGH TO CLEAR THE ENERGY GRADE PROFILE FOR A DISCHARGE OF 2,000 CUBIC FEET PER SECOND.
7TH STREET
ELEVATION IN FEET (NGVD)
1265
1260
1255
1250
1245
1240
1235
1230
1225
1220
5200
5400
5600
5800
6000
6200
STREA
K
L
M
N
O
P

1


ESENT THE CONDITION
LEVEES ARE PLACED
NEEN CROSS SECTIONS
SHWAY 12 BRIDGE IS
N NOTE 2 BELOW.
Y 12 BRIDGE OPENING
LY 50 FEET WIDE WITH
ELEVATION HIGH ENOUGH
GRADE PROFILE FOR A
CUBIC FEET PER SECOND.
P
Q
LE
6000
6200
6400
6600
6800
7000
7200
7400
STREAM DISTANCE IN FEET



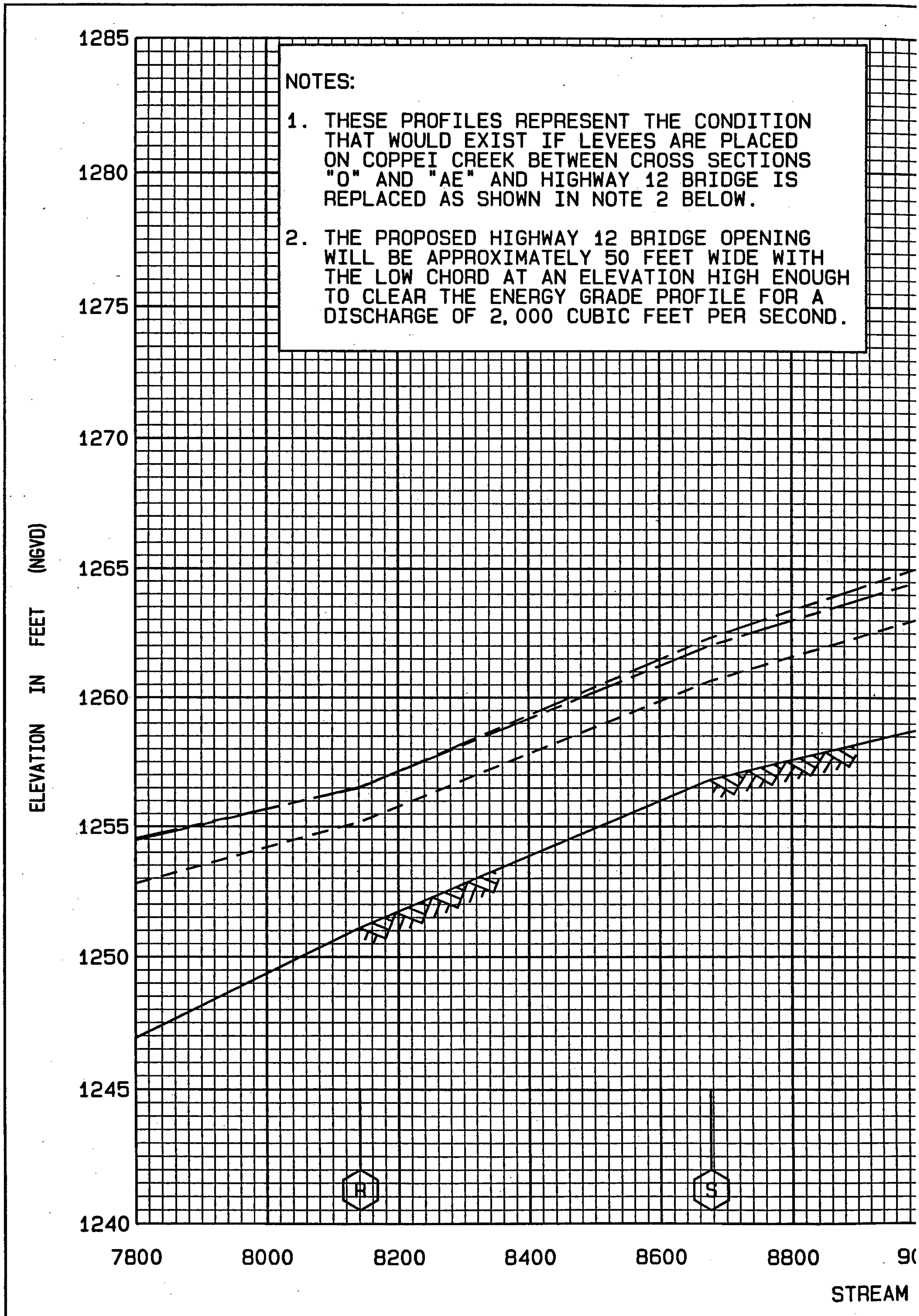
FLOOD PROFILES MARCH 2001

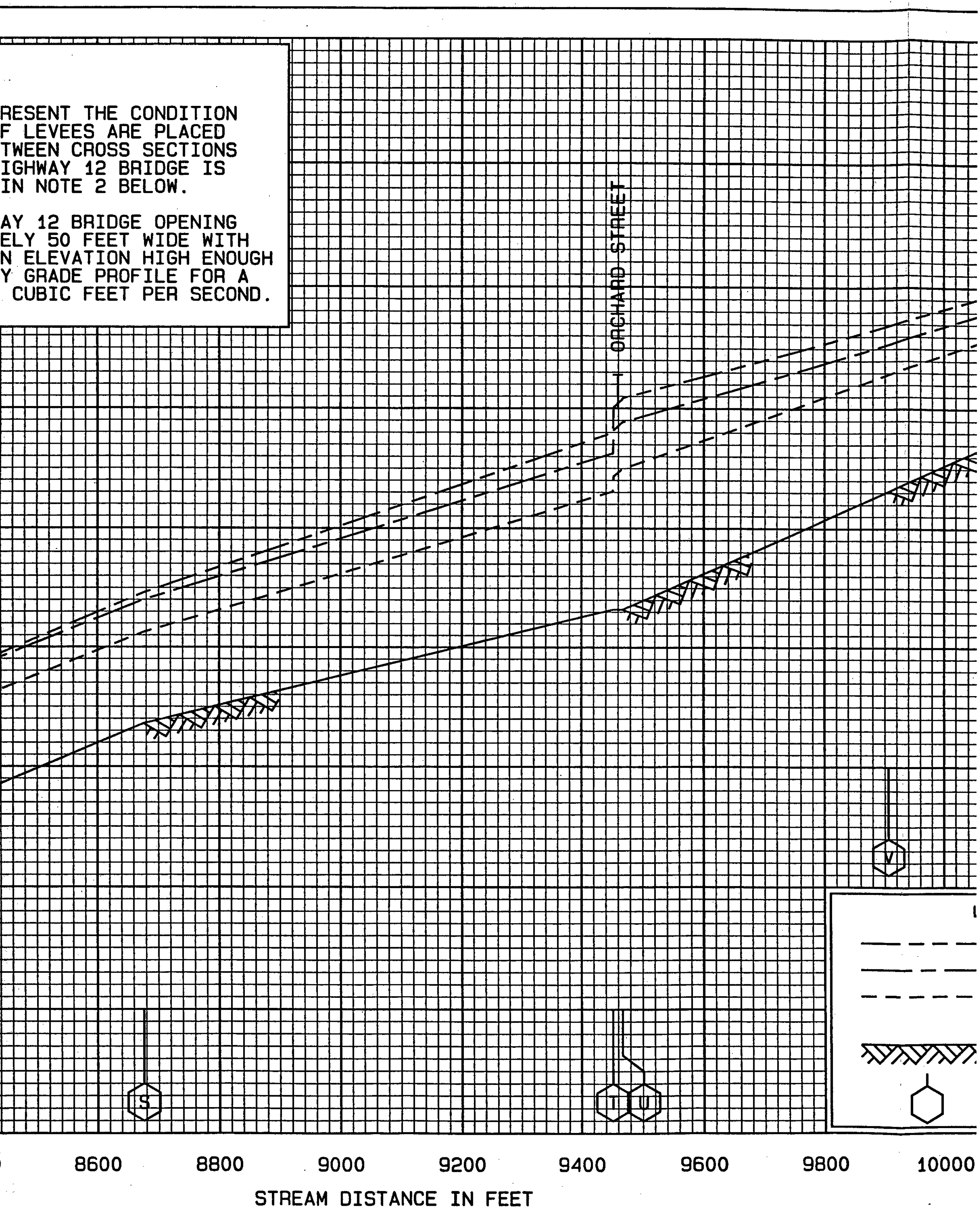
COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 10


NOTES:
1. THESE PROFILES REPRESENT THE CONDITION THAT WOULD EXIST IF LEVEES ARE PLACED ON COPPEI CREEK BETWEEN CROSS SECTIONS "O" AND "AE" AND HIGHWAY 12 BRIDGE IS REPLACED AS SHOWN IN NOTE 2 BELOW.
2. THE PROPOSED HIGHWAY 12 BRIDGE OPENING WILL BE APPROXIMATELY 50 FEET WIDE WITH THE LOW CHORD AT AN ELEVATION HIGH ENOUGH TO CLEAR THE ENERGY GRADE PROFILE FOR A DISCHARGE OF 2,000 CUBIC FEET PER SECOND.
ELEVATION IN FEET (NGVD)
1285
1280
1275
1270
1265
1260
1255
1250
1245
1240
R
S
7800
8000
8200
8400
8600
8800
9(
STREAM



RESENT THE CONDITION
F LEVEES ARE PLACED
TWEEN CROSS SECTIONS
IGHWAY 12 BRIDGE IS
IN NOTE 2 BELOW.
AY 12 BRIDGE OPENING
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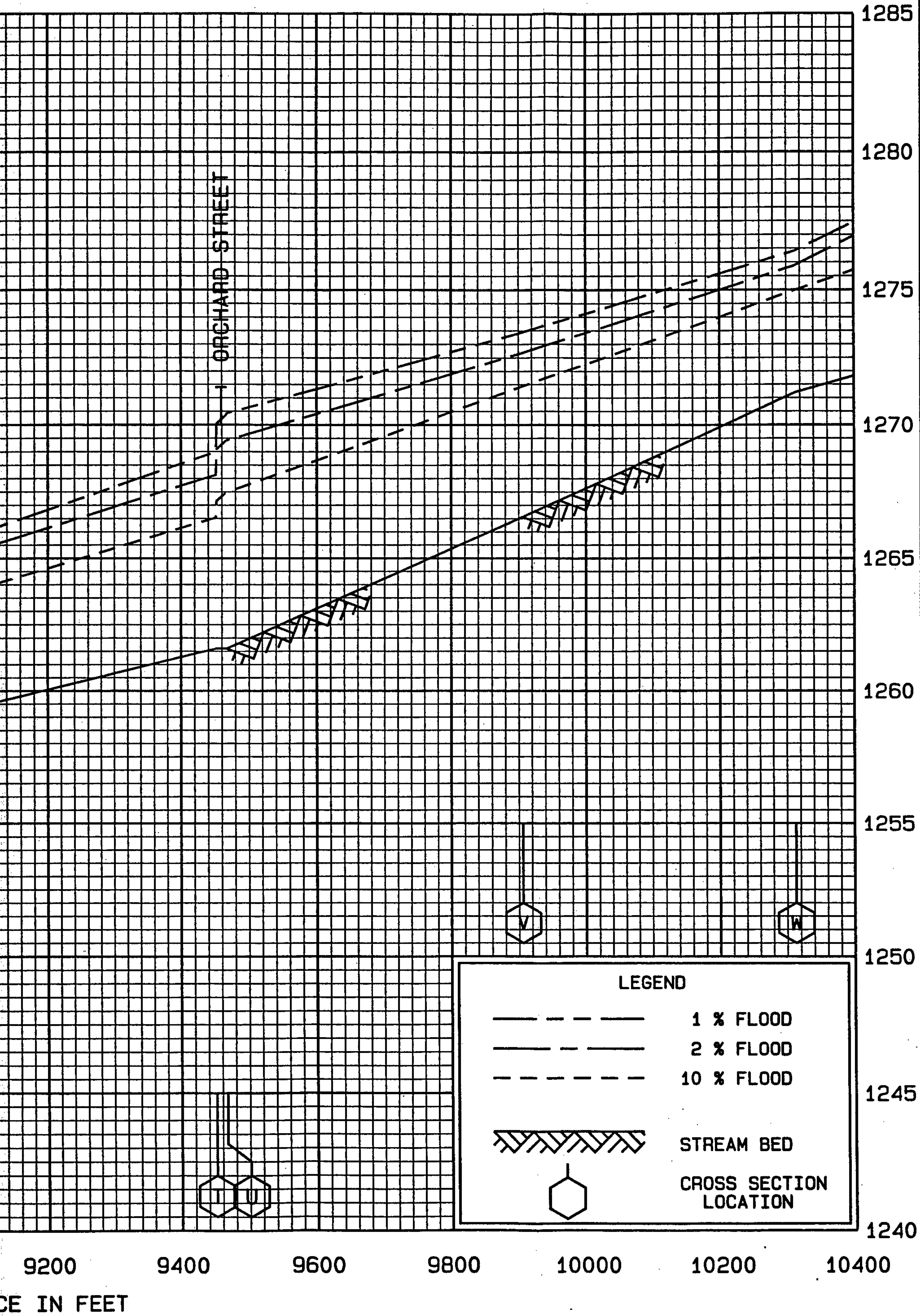


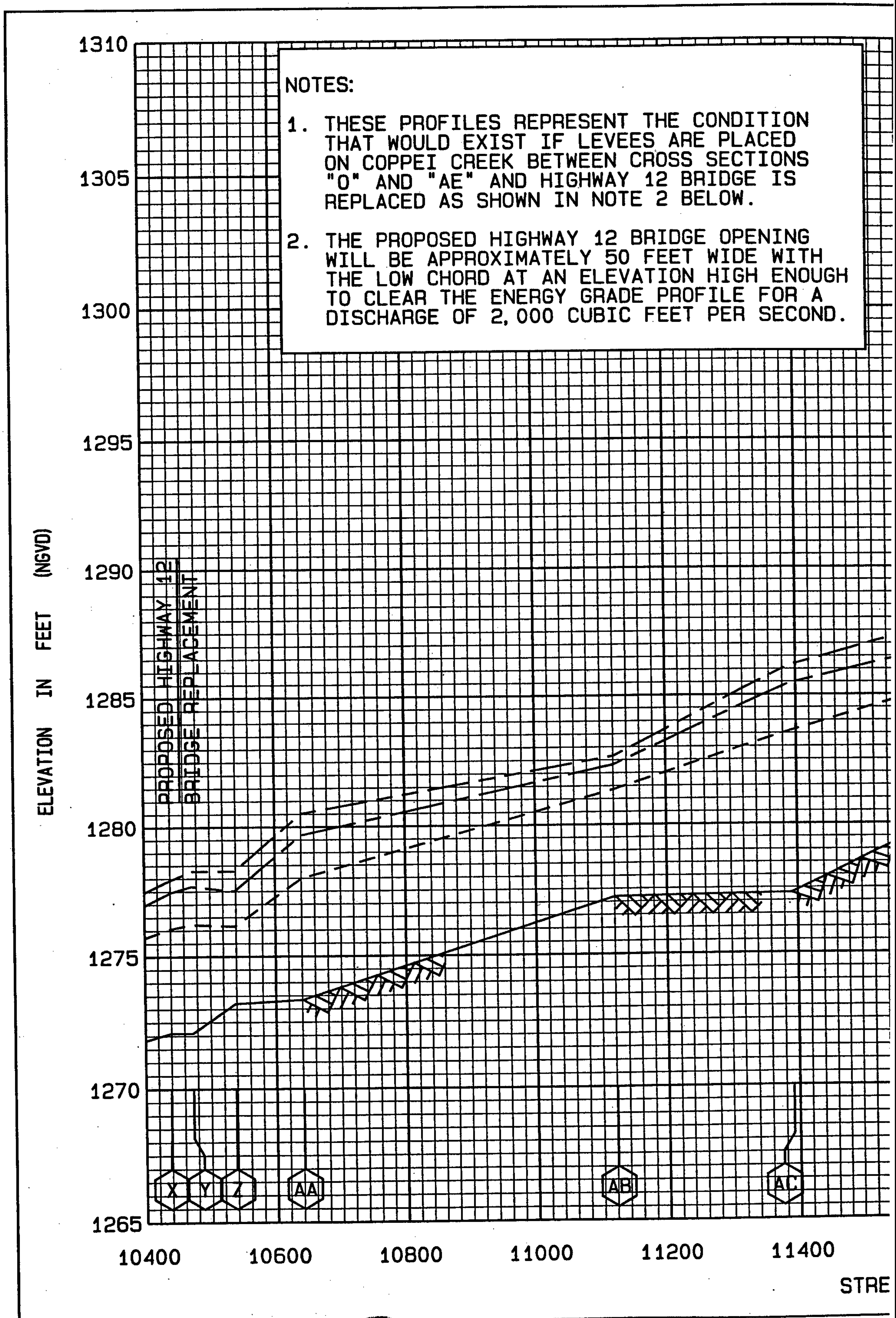
FLOOD PROFILES MARCH 2001

COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 11


NOTES:
1. THESE PROFILES REPRESENT THE CONDITION THAT WOULD EXIST IF LEVEES ARE PLACED ON COPPEI CREEK BETWEEN CROSS SECTIONS "O" AND "AE" AND HIGHWAY 12 BRIDGE IS REPLACED AS SHOWN IN NOTE 2 BELOW.
2. THE PROPOSED HIGHWAY 12 BRIDGE OPENING WILL BE APPROXIMATELY 50 FEET WIDE WITH THE LOW CHORD AT AN ELEVATION HIGH ENOUGH TO CLEAR THE ENERGY GRADE PROFILE FOR A DISCHARGE OF 2,000 CUBIC FEET PER SECOND.
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BRIDGE REPLACEMENT
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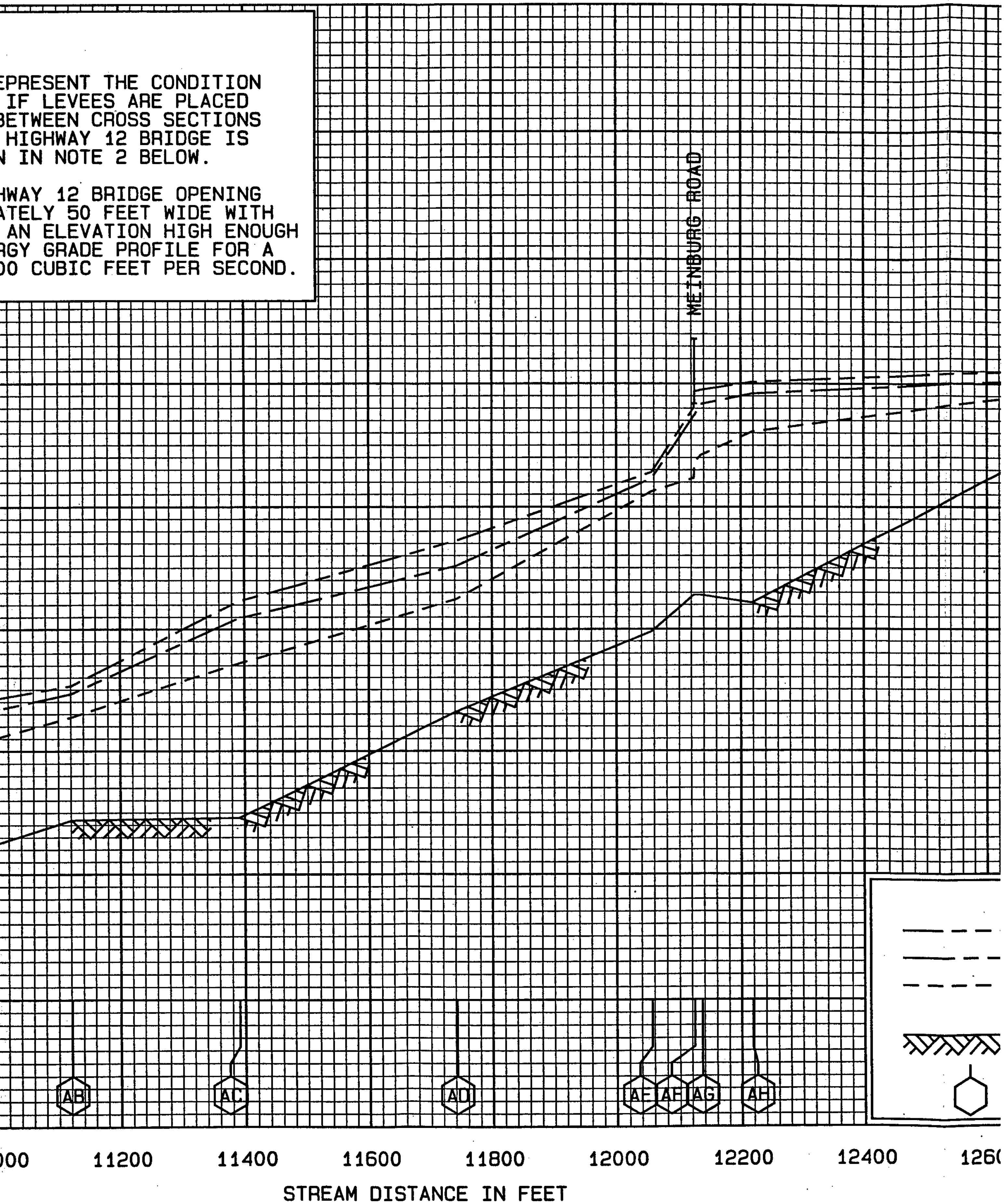
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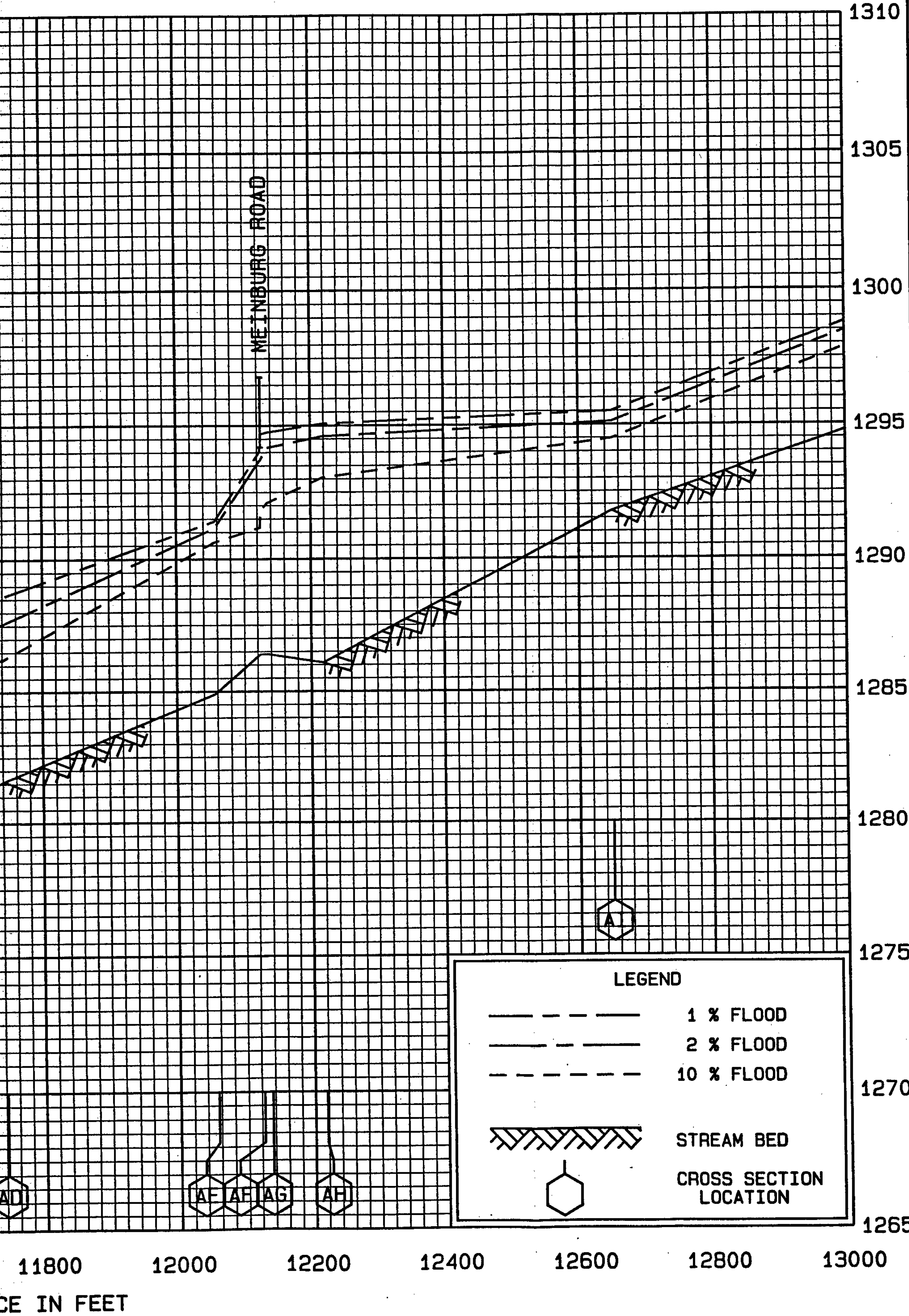


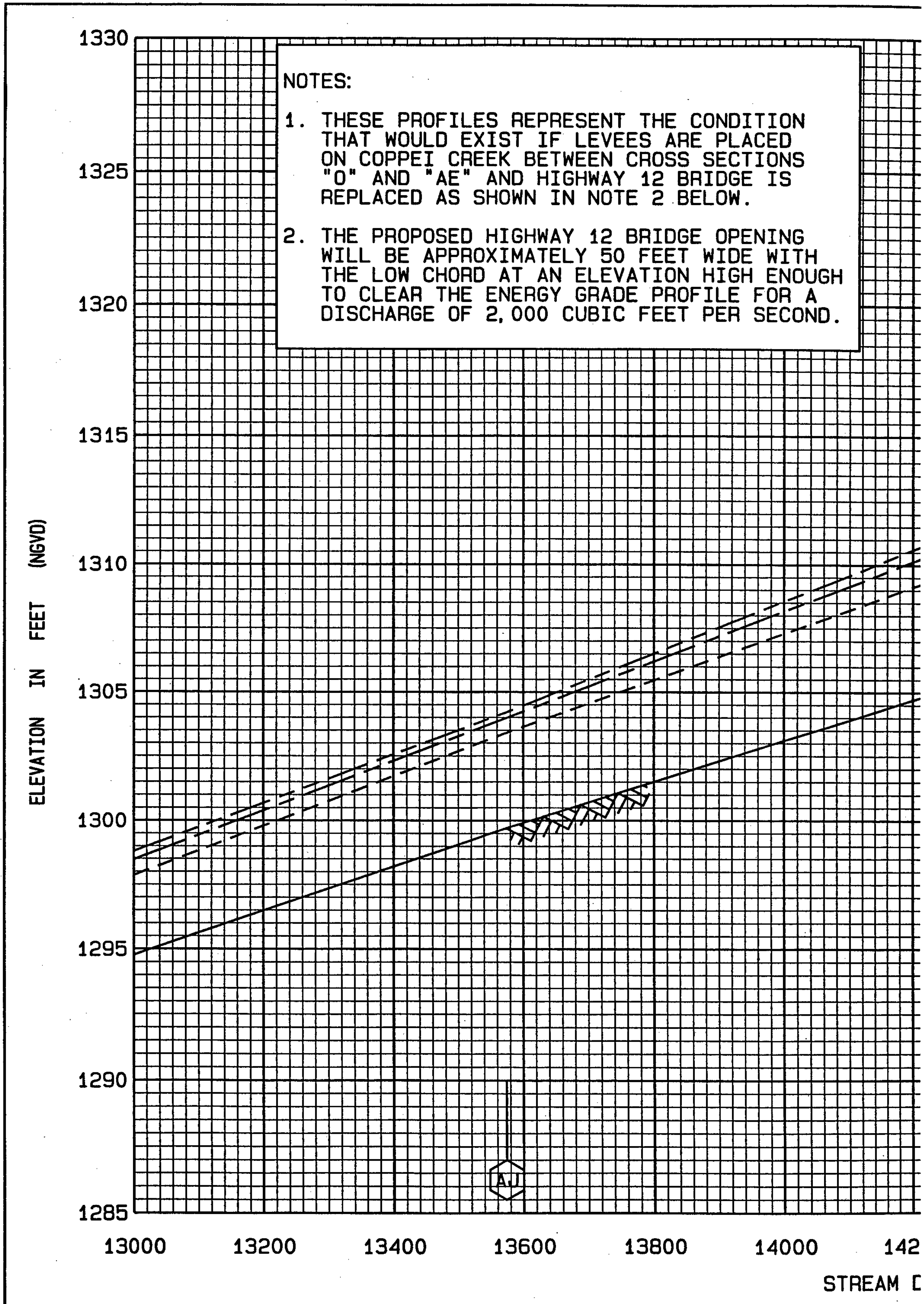
FLOOD PROFILES MARCH 2001

COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON
WALLA WALLA COUNTY

PLATE 12



NOTES:

1. THESE PROFILES REPRESENT THE CONDITION THAT WOULD EXIST IF LEVEES ARE PLACED ON COPPEI CREEK BETWEEN CROSS SECTIONS "O" AND "AE" AND HIGHWAY 12 BRIDGE IS REPLACED AS SHOWN IN NOTE 2 BELOW.

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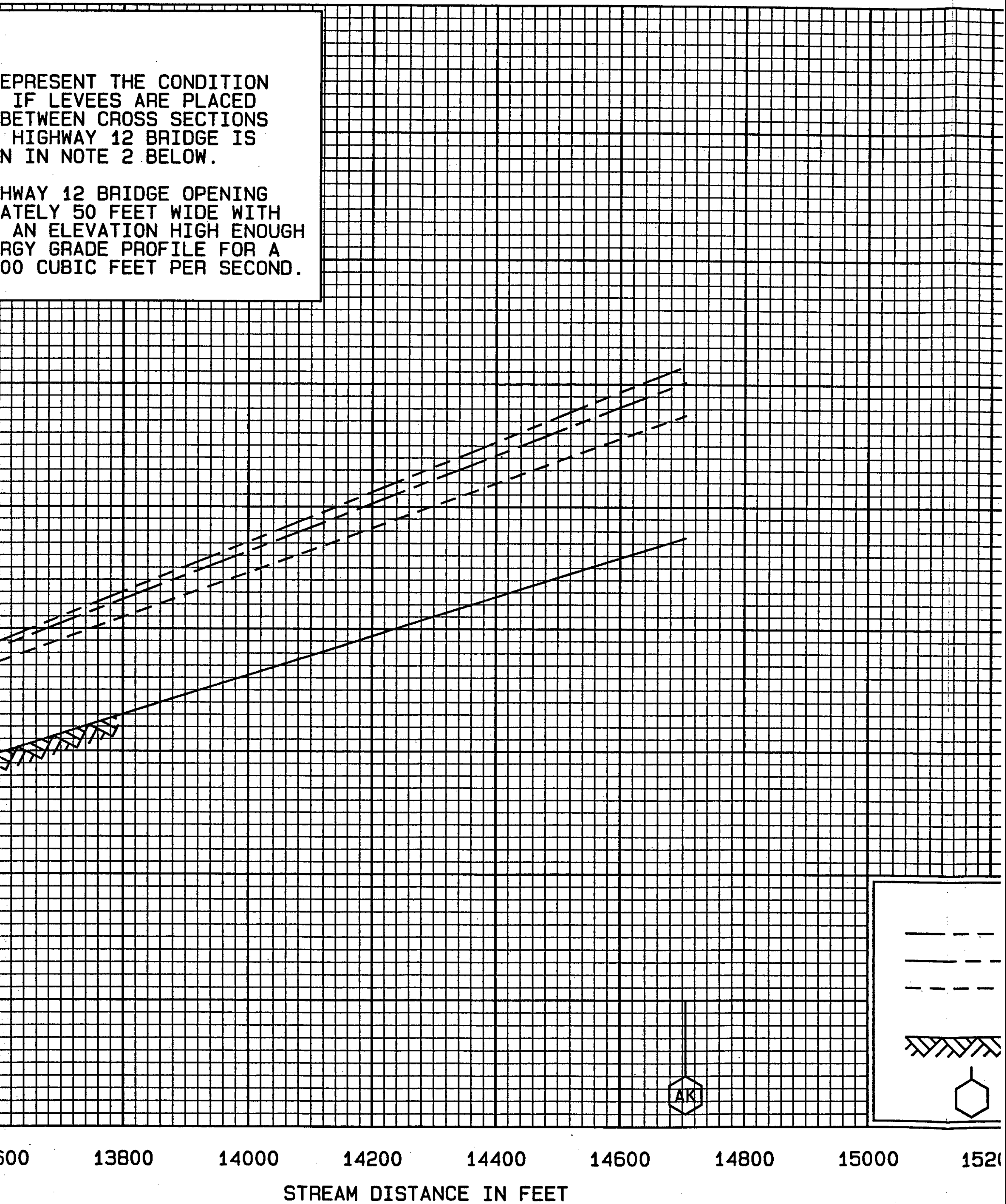
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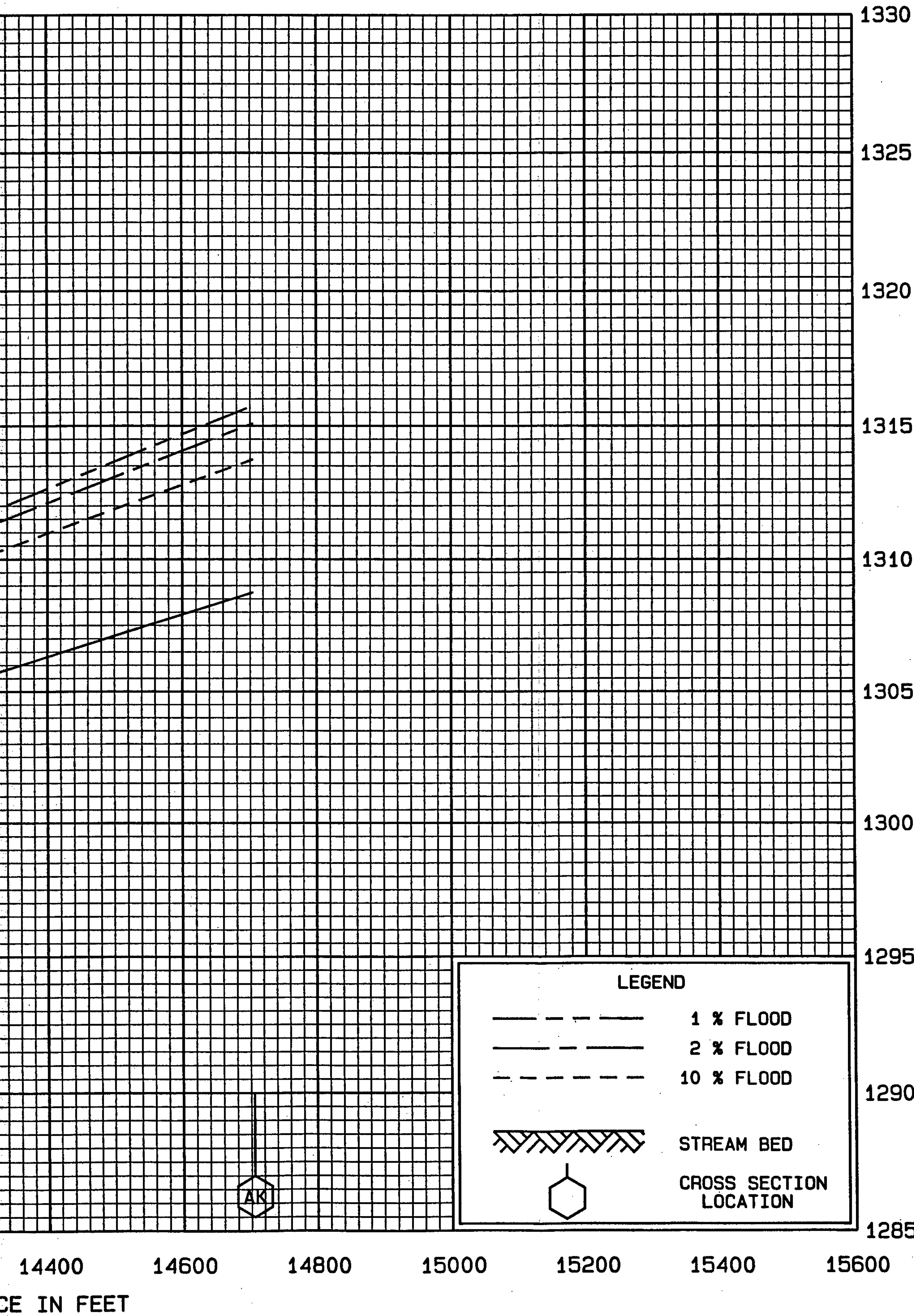


FLOOD PROFILES

MARCH 2001

COPPEI CREEK

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA

WAITSBURG, WASHINGTON

WALLA WALLA COUNTY

PLATE 13

APPENDIX B

HYDROLOGY

PHOTOS

Photo 1. Touchet River Downstream (West) of Waitsburg, Washington.
Photo 2. Looking West Along U.S. 12 at Waitsburg, Washington, at Bridge.
Photo 3. Fairgrounds Track South Side of Waitsburg.
Photo 4. Flooding at Waitsburg, Washington, Fairgrounds.

Photo 1. Touchet River Downstream (West) of Waitsburg, Washington.
Looking Northwest Sewage Disposal Plant on Lower
Right Hand Corner.
February 9, 1996

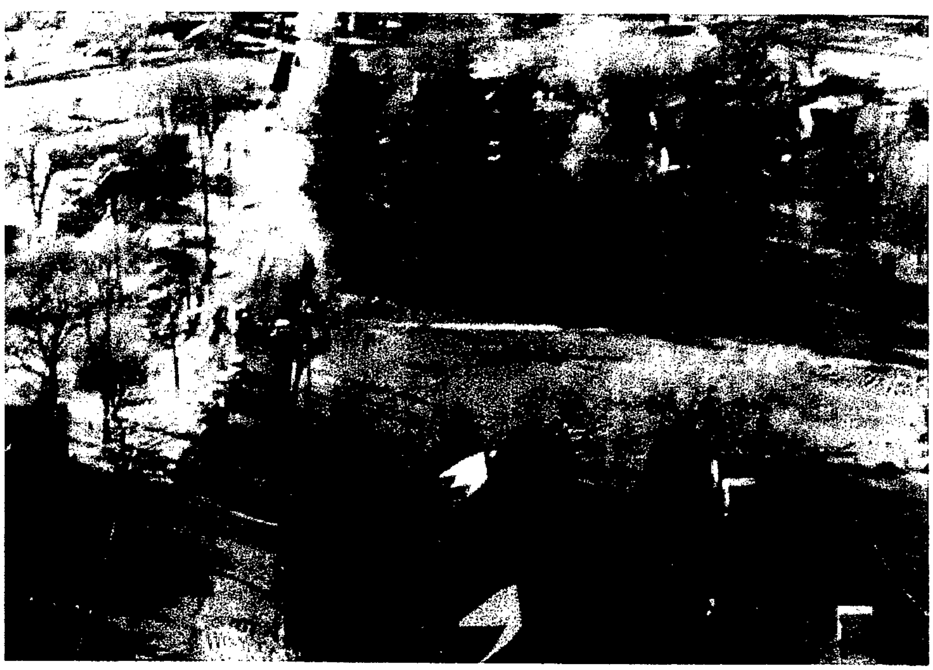


Photo 2. Looking West Along Highway 12 at Waitsburg, Washington,
Highway 12 Bridge across Touchet River. Right Bank Levee
Upstream of Highway 12 Bridge was Overtopped "From Behind" by
Waters that had Broken Out Upstream.
February 9, 1996

Photo 3. Fairgrounds Track South Side of Waitsburg, Washington.
Flooding in Area Due to Coppei Creek
February 9, 1996

Photo 4. Flooding at Waitsburg, Washington, Fairgrounds Due to Coppei Creek. Looking South. Highway 12 in Right Side of Photo.
February 9, 1996

APPENDIX C

BIOLOGICAL ASSESSMENT

Coppei Creek Flood Control Project
Waitsburg, Washington

(Sheets referenced in this Biological Assessment
are found in the main report section

U.S. Army Corps of Engineers
Walla Walla District

May 2001

BIOLOGICAL ASSESSMENT

COPPEI CREEK SETBACK LEVEE AND BRIDGE REPLACEMENT PROJECT

Section 205

May 25, 2001

INTRODUCTION

This Biological Assessment considers potential impacts on species listed under the Endangered Species Act from a proposed flood damage reduction project in Waitsburg, WA. The proposed project is to construct a setback levee and floodwall on the right bank (looking downstream) of Coppei Creek and to replace the U.S. Route 12 (U.S. 12) bridge over Coppei Creek in Sections 14 and 15, Township 9 North, Range 37 East, W.M. Walla Walla County. The proposed project would include work by the Corps of Engineers (Corps) and Washington State Department of Transportation (WSDOT) for the City of Waitsburg as authorized by Section 205, Flood Control Act of 1948. Work is scheduled to begin in the early summer of 2003. Maps and drawings of the project area are included (See sheets 1-7 in the main report).

In February 1996, Coppei Creek experienced back-to-back floods. The flood peaks were only a few days apart. The approximate discharge, as determined from high water marks, was estimated at 48 cubic meters per second (cms) (1700 cubic feet per second (cfs)) (approximately 70 year recurrence interval or 1.4% chance flood). During the 1996 event, an unquantified portion of the Coppei Creek discharge flooded over the right bank (looking downstream) upstream of the U.S. 12 bridge. The discharge flowed north through the fairgrounds, residential property, and along U.S. 12 combining with Touchet River floodwaters in downtown Waitsburg. After the 1996 flood event, WSDOT removed sediment that had reduced the stream capacity under the bridge. Since that time sediment has again accumulated and has reduced the amount of flow able to pass through the bridge. If the 100-year flood event [about 57 cms (2000 cfs)] (1% chance flood) occurs and the proposed levee and bridge replacement is not installed, substantial damage to the City of Waitsburg is expected.

PROJECT DESCRIPTION

Several alternatives were evaluated to find the best solution to meet the goals of the project while minimizing impacts to the environment. The preferred alternative is an earthen levee and floodwall set back about 7.6 to 145 meters (25 to 475 feet) from the ordinary high water mark of Coppei Creek. Close to the U.S. 12 bridge, houses are close to the creek bank. In this area, a concrete floodwall, set back a minimum of 7.6 meters (25 feet) from the ordinary high water line, is proposed in order to impact as little property as possible while leaving space for a riparian corridor. The design of the channel in this restricted area includes leaving as much existing vegetation as possible

and revegetation with small woody vegetation such as willows to provide shade and cover to the stream. Conceptual designs of this section are shown in sheets 2, 4, and 5 of the main report. Upstream of the floodwall, the earthen levee would be setback 20 to 120 meters (65 to 400 feet). Downstream of the floodwall, the levee would be set back 20 to 145 meters (65 to 475 feet). The U.S. 12 bridge would also be replaced with a larger bridge. A total of 25,650 cubic yards of material will be placed along or within the 100 year floodplain for construction of the walls and levees. An additional 1200 cubic yards will be placed within the 100 year floodplain for construction of the new bridge.

Earthen Sections of the Levee

The earthen levee cross-section would be 3 meters (10 feet) wide at the top with side slopes of 1 unit vertical to 3 units horizontal with a layer of riprap protection at the toe on the creek side. The required levee height is estimated to vary from about 1 to 2 meters (3 to 6 feet) making the base of the levee about 14 meters (46 feet) at its widest point. This portion of the levee would not impact existing riparian vegetation or the stream profile. The levee would be constructed with 23000 cubic yards of material including 510 cubic yards of riprap. The levee would be covered with geotextile fabric, topsoil, fertilized, then planted with grass to match the surrounding vegetation. Trees larger than four inches in diameter would not be permitted to establish on the levee for structural integrity reasons. Current landuse practices of cultivated agriculture and grazing would continue between the levee and the riparian zone.

The upstream portion of the levee would begin at the upstream (east) end of the project area where it would be tied into a hill. The levee would be constructed around the perimeter of the fairgrounds and then head northwest until it nears the developed residential area. There, approximately 400 feet upstream of the bridge, the levee will connect with the new concrete floodwall. The wall would tie into the new bridge abutments and extend another 400 feet downstream, tying into high ground. This area of high ground would provide sufficient flood protection for approximately 180 meters (600 feet) along the creek. The downstream portion of the earthen levee would tie into the west side of this high ground and follow the outside edge of the agricultural fields.

Floodwall Sections of the Levee

Near the U.S. 12 bridge, both upstream and downstream, private homes are close to the creek. To minimize and balance impacts to landowners and the creek, a concrete floodwall from four to seven feet high and one foot thick is proposed for this reach. The wall would not take up as much space as an earthen levee. The wall would be setback at least 7.6 meters (25 feet) from the ordinary high water line of the creek. This will allow a larger area (than the existing condition) for a more natural bank and riparian vegetation. Existing vegetation between the creek and the wall would be left intact, except for the trees that are within the footprint of the wall alignment. The area between the wall and the creek would soon revegetate with riparian vegetation.

Prior to construction of the floodwall, the berm immediately upstream of the bridge would be leveled. This berm is made of gravel, earth fill, and riprap. The berm sits directly adjacent to the creek, but has no subsurface structure. The top of the berm (the portion of the berm that is of higher elevation than the ground directly behind it) would be removed using heavy equipment. The berm has been pushed up around several large trees, which would be left in place and the riprap pulled out from around them. Any riprap below the ordinary high water mark would be left in place to minimize disturbance to the stream. Vegetation that reestablishes between the wall and the stream will be left intact, except for a 25 foot distance from the bridge where trees larger than 4 inches in diameter may be periodically cut down so that they do not trap debris which would threaten the bridge.

Floodwall 1 would tie into the northeast abutment of the new bridge. The northwest abutment of the bridge would tie into floodwall 2, extending approximately 400 feet west before tying into high ground. The floodwall would be constructed out of reinforced concrete. It would require a concrete footing for support. The footing would be constructed behind the wall (i.e. farther from the creek than the wall itself). This footing would be buried with topsoil, leaving as much as 2.1 meters (7 feet) of wall exposed above the ground. Riprap would also be placed under ground level to protect the wall against erosion in the event of a flood. The placement of the walls would require the removal of several trees within the footprint, but would leave a majority of the riparian area intact.

Equipment will be staged in designated areas a minimum of 50 meters from the stream channel. At least two staging areas will be used for the levee construction; one near the upstream end and one near the downstream end. All equipment maintenance and refueling would take place in the staging areas.

Bridge

A larger bridge would replace the existing U.S. 12 bridge over Coppei Creek. The existing bridge was built around 1929. The bridge replacement is necessary to provide adequate capacity to pass high flows. The new bridge would be elevated about one meter (3 to 5 feet) above the existing bridge deck level. Some trees would need to be removed for installation of the detour bridge and for construction of the new bridge. The temporary bridge would be removed when the new bridge is completed. No in-water work is required for construction or removal of the temporary bridge.

The temporary detour road and bridge would be placed adjacent to the existing structure. The temporary bridge would be 50 feet long and 30 feet wide, spanning the entire stream. Only minimal excavation would be required to support the temporary bridge. The footings for the detour bridge would be placed on top of the existing ground surface. Geotextile material would be folded over layers of gravel to create a series of 1-foot lifts that would support the bridge (see sheet 7 in the main report). Throughout the rest of construction, traffic will be rerouted onto the temporary bridge.

In order to protect the stream from damage by construction activities, the contractor may choose to secure a geotextile fabric to the ground below and around the bridge to contain any debris. The fabric would be placed in the streambed and the stream would flow directly over the top. Alternately, the contractor may choose to install a culvert for the duration of in water work. If a culvert were used, it would be designed to maintain fish passage during the construction period. During removal of the bridge abutments, the stream flow would need to be rerouted through the construction area in order to separate excavation and placement of material from flowing water. The installation of a culvert would accomplish this, as would rerouting of the stream with sandbags. Removal of the existing bridge would include excavating the existing bridge footing material from below the ordinary high water mark and would take approximately two weeks.

The new bridge would be 50 feet long and 48 feet wide, a single arch spanning the entire creek. The new bridge abutments would be constructed of reinforced concrete. Construction of the new bridge includes placement of new footings below the ordinary high water line. All work below the ordinary high water line would be completed before the end of the approved work window, September 30. Fresh concrete or water containing fresh concrete would not be allowed in direct contact with the stream. Some riprap may be placed next to the new bridge abutments to protect them against erosion. The new bridge would be about one meter (3 to 5 feet) higher than the existing structure, requiring new approaches on the north and south sides. The new U.S. 12 bridge will be designed in a manner that will accommodate connection to the new floodwalls on the north abutments. After construction is complete, the contractor would return the streambed to its previous condition and revegetate the disturbed ground with native trees and grasses.

A borrow area has not been identified for either the levee core or topsoil, but discussions with local contractors indicate that there are commercial sources in the area. A definite schedule has not been established at this time, but a tentative schedule is presented below. Construction of the levee and bridge replacement would be expected to last about seven months. The in-water work required for the bridge replacement would be limited to July 15 to September 30 to minimize impacts on aquatic species. Temporary staging areas would be required during construction. These areas would be located at least 50 meters from the creek. All disturbed surfaces would be reseeded upon completion of the project.

The present schedule is for project construction to occur between June 2003 and April 2004. The in-water work would occur between July 15, 2003 and September 30, 2003. Flows will be diverted to avoid excavations in the active river channel. Flows are expected to be low during the construction period ranging from 1 to 4 cfs. For removal of the old bridge, the objective will be to perform the work outside of flowing water. Excavation of the existing bridge piers and abutments in standing water would be allowed. Two methods for care and diversion of water are currently envisioned:

Method 1 would consist of constructing cofferdams around required excavations. The cofferdams would be constructed using sandbags, which would preclude flowing water from entering required excavations. After the excavation work has been completed and the new footings have been installed, the sandbags would be removed.

Method 2 would consist of diverting flow into a culvert that would carry the flow from upstream of the required excavation area to a point downstream from required excavation. The diversion into the culvert would likely consist of sandbags, or a gravel berm constructed of river material. This temporary culvert would be designed to facilitate fish passage. At least a 48" wide culvert buried into the creekbed would be used. A bottomless culvert may also be considered.

While the exact methods of removal of the existing bridge will be left up to the contractor, several requirements must be met by any proposed method. The Washington State Department of Transportation and the Washington State Department of Ecology have an Implementing Agreement regarding compliance with the State of Washington surface water quality standards dated February 13, 1998. Applicable conditions and requirements from that agreement are listed here and will be used as Best Management Practices to minimize impacts to water quality and the environment.

Best Management Practices (BMPs)

-General Conditions

- 1. The activities must comply with all water quality protection related conditions contained in the Washington State Department of Fish and Wildlife (WDFW) Hydraulic Project Approval (HPA) including time limitations.
- 2. Copies of the general conditions and the specific conditions that apply to the project site contained within this agreement shall be reviewed with all hired contractors prior to the start of the project and kept on the job site at all times during construction.
- 3. When removing and repairing existing structures, all demolition and construction material shall be removed from the water and disposed of properly in an upland site. Requirements contained in the HPA for dealing with large concrete pieces will be followed. If the method of taking the bridge apart is to saw-cut portions off, tarping is required to control and contain all saw-cut water. The saw-cut water shall be disposed of on land with no possibility of entry to surface waters. Under no circumstances shall free fall dumping of fill material occur in or next to any water body unless control structures are in place to prevent sediment from directly entering the waterbody.
- 4. The natural flow of any affected waterbody shall be diverted around the construction site unless written approval to work in the flowing water is obtained from WDFW. Diversion may entail tightlining, coffer dams, or equivalent structures. The stream diversion system shall be designed and operated so as to not cause erosion or scour in the stream channel or banks of the waterbody.

- 5. Material used to construct road approaches to access the project site shall be of clean composition and placed in a manner to prevent erosion and siltation that might result from high water and/or heavy rains. The approach area shall be stabilized and planted to meet WDFW and local requirements upon completion of the project.
- 6. Riprap shall be clean and durable, free from dirt, sand, clay, and rock fines.
- 7. Unless authorized by WDFW, heavy equipment shall not enter the water and will be operated as far from the waters edge as possible. Impacts to bank and shoreline vegetation shall be limited to the maximum extent possible. Areas damaged by equipment or by placing of approach materials shall be stabilized or replanted where destroyed or damaged by equipment.
- 8. WSDOT shall consult with WDFW, local governments, or the Natural Resource Conservation Service for ideas on beneficial uses of any large woody debris material prior to disposal of such material. Large woody debris is defined as trees or tree parts larger than four inches in diameter and longer than six feet and rootwads. Large woody debris may be specifically authorized by WDFW to be left in the stream below the bridge.
- 9. Bank vegetation shall be protected during removal and storage of debris material. If vegetation is destroyed, the bank shall be immediately replanted upon completion of debris removal.
- 10. When removing material, equipment shall operate from the bridge or bank. Unless authorized by WDFW, no heavy equipment shall enter the flowing water. If allowed by WDFW, the Washington State Department of Ecology (Ecology) authorized turbidity dilution zones shall be met, and no visible sheen of oil shall be allowed.

<u>-Water Quality BMPs</u>

- 1. The project will be designed to avoid or minimize impacts to waters of the state. There shall be no visible sheen from petroleum products in the receiving water as a result of project activities. Work in or near the waterway shall be done so as to minimize turbidity, erosion, other water quality impacts, and stream bed deformation. All construction debris and excess sediment shall be properly managed and disposed of so as to prevent it from entering the waterway or cause water quality degradation to state waters.
- 2. All work in or near the water and water discharged from the site shall meet the State's Water Quality Standards, WAC 173-201A. A mixing zone for turbidity is authorized within WAC 173.201A-030 during and immediately after necessary in-water or shoreline construction activities that result in the disturbance of in-place sediments. Use of a turbidity mixing zone is intended for brief periods of time (such as a few hours or days) and is not an authorization to exceed the turbidity standard for the entire duration of construction. Use of the mixing zone is subject to the constraints of WAC 173-201A-100(4) and (6), requiring an applicant to have supporting information that indicates the use of the mixing zone shall not result in the loss of sensitive or important habitat, substantially interfere with the existing or characteristic uses of the water body, result in damage to the ecosystem, or

adversely affect public health. The mixing zone is authorized only after the activity has received all other necessary local and state permits and approvals, and after the implementation of appropriate best management practices to avoid or minimize disturbance of in-place sediments and exceedances of the turbidity criteria. Within the mixing zone, the turbidity standard is waived, and all other applicable water quality standards remain in effect. The mixing zone is defined as follows: For waters up to 10 cfs flow at the time of construction, the point of compliance shall be 100-feet downstream of project activities.

-Concrete handling BMPs

- All concrete shall be poured in the dry, or within confined waters not being dewatered to surface waters, and shall be allowed to cure a minimum of seven days before contact with water. The waters of the state shall not come in contact with the concrete structure while the concrete is curing. Fresh, uncured concrete in direct contact with the water is toxic to aquatic life. Any dewatering required from a contained area with curing concrete shall be discharged to land with no possible entry to surface waters. A separate area shall be set aside, that does not have any possibility of draining to surface waters, for the wash out of concrete delivery trucks, pumping equipment, and tools.

-Erosion Control BMPs

- All areas disturbed or newly created by the project construction shall be stabilized as soon as possible to prevent erosion and shall comply with the Temporary Erosion and Sediment Control Plan. All erosion control and storm water measures shall meet or exceed WSDOT's Highway Runoff Manual. Periodic inspection and maintenance of all erosion control structures shall be conducted no less than every 7 days. Additional inspections shall be conducted prior to and after expected rainfall events to ensure erosion control measures are in working condition. Any damaged structures shall be immediately repaired. If it is determined at the inspection that additional measures are needed to control storm water and erosion, they shall be implemented immediately.

-Hazardous Spill Prevention and Control BMPs

- No petroleum products, fresh cement, lime or concrete, chemicals, or other toxic or deleterious materials shall be allowed to enter waters of the state. The discharge of oil, fuel, or chemicals to waters of the state or onto land with a potential for entry into state waters, is prohibited. No cleaning solvents or chemicals utilized for tool or equipment cleaning may be discharged to the ground or to waters of the state. All oil, fuel, or chemical storage tanks or containers shall be diked and located on impervious surfaces so as to prevent spills from escaping to surface waters or ground waters of the state. Waste liquids shall be stored under cover. Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc. shall be checked regularly for drips or leaks, and shall be maintained and stored properly to prevent spills into state waters. Proper security shall be maintained to prevent vandalism. Concentrated waste or spilled chemicals shall be transported off site for disposal at

a facility approved by the Department of Ecology or appropriate County Health Department.

-Spill Reporting

- Spills into state waters, spills onto land with a potential for entry into state waters, or other significant water quality impacts such as distressed or dead fish noticed in the project vicinity, shall be reported immediately to the Ecology Eastern Regional Office at 509-456-2926. Containment and clean-up efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Clean-up shall include proper disposal of any spilled material and used clean-up materials. In cases of fish kills the local habitat biologist with the Washington Department of Fish and Wildlife shall be called. If the habitat biologist cannot be contacted, call 360-902-2534.

Maintenance

The levee will be annually inspected for burrowing animals, trees and shrubs, displaced riprap, erosion, and other damages. All trees and shrubs growing on the levee shall be removed. Burrowing animals will also be removed and the borrow holes filled in. Bridge maintenance will be conducted by WSDOT and will follow approved procedures.

DESCRIPTION OF THE PROJECT AREA

Coppei Creek originates on the western slopes of the Blue Mountains in southeast Washington, at an elevation of 1220 meters (4,000 feet). The proposed project location is at about 400 meters (1,300 feet) in elevation. With a total length of about 29 kilometers (km) (18 miles), the creek flows for a combined total of about 30 km (19 miles) as the North and South forks in relatively deep and narrow canyons, through mountainous terrain, and then enters a valley about a quarter mile wide until reaching Waitsburg.

The climate of the Coppei Creek area is predominately dry and is characterized by wide seasonal variations in temperature, as well as wide geographical differences in precipitation. The average afternoon temperature in the summer is near 32°C (90°F), with nighttime temperatures in the 15° to 20°C range (60° to 70°F). In winter, average afternoon temperatures are around 1.5°C (35°F). Extremes of –31° to 46°C (–25° to 114°F) have been recorded in the area. Annual precipitation in the area ranges from about 47 centimeters (cm) (18.5 inches) near Dayton to more than 100 cm (40 inches) in the Blue Mountains.

Flows in Coppei Creek are generally low in July through October and moderate to high in the late winter and early spring months. Intensive rainstorms, excessive snowmelt, or rain-on-snow conditions can cause high flows. Mendel et.al. (2000) monitored streamflow conditions during the summer of 1999. Flows dropped below three cubic feet per second from mid-June through September.

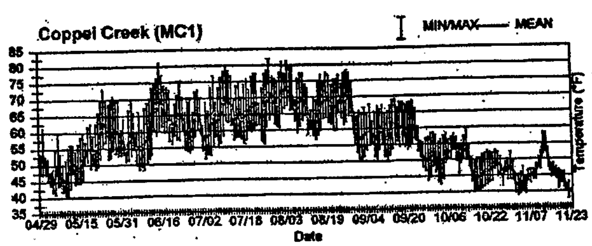
Habitat Evaluation

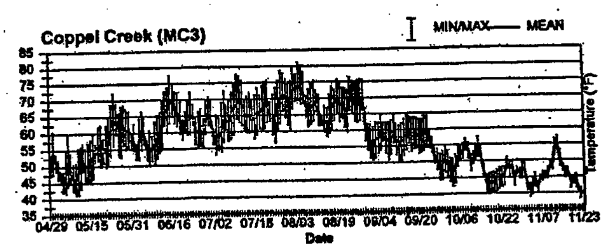
Steelhead were used as the main focus species throughout much of this evaluation because they are present in the stream year-round and have the most potential to be impacted by the proposed project. Field measurements were taken for several parameters from the Fish and Wildlife Service's Habitat Suitability Information for rainbow trout. This document provides optimal ranges for habitat parameters related to rainbow/steelhead trout. Many of the parameters are applicable to other species as well. The field evaluation took place on July 11, 2000. Data was collected in segments, with averages throughout the evaluated reach reported here. The upper half of the stream in the proposed project area was evaluated. The lower reach has less potential for impacts from this project. The habitat parameters in the lower reach would be similar to the evaluated reach. The sinuosity of the lower reach increases dramatically, which may decrease the substrate particle size, but increase the number and quality of pools. The overall habitat ratings would likely be similar. This information is presented in this section for a general overview. Some of this information is repeated in discussions of the individual listed species.

- Maximum water temperature

Steelhead can tolerate temperatures up to 25°C (77°F) for short periods of time. Optimal temperatures are between 12 and 19°C (53.6 to 66.2°F). The Washington Department of Fish and Wildlife collected water temperatures in Coppei Creek in 1999. Mean daily stream temperatures were in excess of 19°C (66.2°F) from the beginning of July to the last week of August, reaching a maximum daily mean temperature of around 22°C (72°F). Maximum daily temperature exceeded 25°C on 29 days, peaking at 27.8°C (82°F) around the first of August. Figures 1 and 2 are stream temperature graphs of mainstem Coppei Creek taken from Mendel et.al. 2000.

Figures 1 and 2. Mainstem Coppei Creek stream temperatures, 1999 (Mendel, et.al. 2000).





- Pools

Pools are inhabited throughout the year by adult and juvenile trout. Pools are important to trout as a refuge from adverse conditions during winter. The percentage of pools is optimum between 35 and 65%. The percent of pools in the evaluated reach was 22%.

Because pools differ in their ability to provide resting areas and cover, pools are separated into three classes; type 1 being the highest quality; type 3 being the lowest quality. The percentage of pools within the evaluated reach was, Type 1 - 24%, Type 2 - 48%, and Type 3 - 28%.

- Thalweg depth

Thalweg depth is related to the amount and quality of pools. For streams less than 5 meters wide (wetted width) the acceptable thalweg depth is 8 to 30 cm, above 30 cm is optimum. The bankfull width of Coppei Creek averaged 6.2 meters. The wetted width of the low flow channel was generally less than 2 meters. The mean thalweg depth measured only in the riffles was 9 cm (31 cm at bankfull). The estimated overall thalweg depth on July 11, 2000 was around 23 cm. This is based on the percentage and depths of pools, riffles, and runs. This estimate would likely be lower later in the summer.

- Substrate

The size and distribution of the substrate affects many elements critical to a trout's lifecycle. Too much fine substrate can choke incubating eggs and decrease insect production. Some large substrate is essential to provide cover for juveniles. The percent of fines (<3mm) in riffles during average summer flows is optimum below 10%. The percentage of fines in the evaluated reach was estimated at 1.1%. The optimum percentage of substrate in the range of 10-40 cm for juvenile wintering and escape cover is above 10%. The percentage of substrate above 10 cm in the evaluated reach pebble counts was only 1.1%. The predominant substrate type in the riffles for food production was gravel. Gravel lies in the middle of the acceptability ranking for this variable.

- Cover

In-stream cover is important as a hiding and resting refuge. The optimal in-stream cover percentage is above 14%. In-stream cover was estimated at about 12% during the evaluation.

The percent of streamside vegetation ground cover is important in providing shade and allochthonous input to the stream. The index value is based on 2 times the %shrubs + 1.5 times the %grasses + the %trees. The optimum index value is above 150. The value estimated during the evaluation was 127.

The percentage of rooted vegetation and stable ground cover along the bank is optimum above 75%. The percentage estimated during the evaluation was 79%.

The percentage of mid-day shade is optimum between 50-75%. The percentage estimated during the evaluation was 59%.

- Miscellaneous

- Algae covered the streambed throughout much of the evaluated reach.
- There was about 90 meters of undercut bank in the 875 meters of stream evaluated.
- Two rainbow/steelhead trout in the 5 to 13 cm range were observed during the evaluation. No temperature data was collected during the evaluation. WDFW may have recent (2000) stream temperature data available soon.

Sections of the stream, in the proposed project area have been cleared and/or straightened many years ago. There are also remnants of old dikes along the right bank throughout the reach. Some channel downcutting has taken place. The creek is very sinuous in the reach between the U.S. 12 bridge and the 7th Street bridge. Some of these large meanders are becoming very close to cutting off. When this occurs, the channel will adjust, causing additional downcutting in areas and deposition in others. The preferred levee alignment is well back away from this area. Land that could be impacted by channel adjustments consists of agricultural fields and pastures. The right bank, upstream of the U.S. 12 bridge, is leveed with rip-rap. Some trees exist near the levee that provide minimal shade. Trees on the left bank would not be impacted.

- Conclusion of Habitat Suitability

The stream habitat is suitable for steelhead in the project area. Pools were not optimum, but they were sufficient. The thalweg depth was suitable. Substrate cover was insufficient, but the low amount of fines was optimum and the amount of gravel for food production was sufficient. Instream cover was also sufficient. Maximum water temperature exceeded the upper limit for steelhead on several days, but only for short periods.

Following is a checklist for documenting the environmental baseline and effects of the proposed action on relevant anadromous salmonid habitat indicators. This checklist is based on Coppei Creek. Habitat conditions downstream on the Touchet River, the Walla Walla River, and the Columbia River may be different. All conditions on the checklist will be maintained by the proposed project. Small improvements in floodplain connectivity will be realized upstream of the bridge, where the existing dike will be replaced by a setback levee. The only floodplain that will be lost is within developed areas of the city of Waitsburg during extremely high flows.

Diagnostic/Pathway Indicators	Baseline Environmental Conditions			Effects of Project Actions on Environmental Conditions		
	Properly Functioning	At Risk	Not Properly Functioning	Improved	Maintained	Degraded
Water Quality						
Temperature			X		X	
Sediment	X				X	
Chemical Contamination/Nutrients		X			X	
Habitat Access						
Physical Barriers	X				X	
Habitat Elements						
Substrate Embeddedness	X				X	
Large Woody Debris			X		X	
Pool Frequency			X		X	
Pool Quality		X			X	
Off-Channel Habitat		X			X	
Refugia		X			X	
Channel Conditions and Dynamics						
Width/Depth Ratio		X			X	
Streambank Condition			X		X	
Floodplain Connectivity			X		X	
Flow/Hydrology						
Change in Peak/Base Flow		X			X	
Drainage Network Increase		X			X	
Watershed Conditions						
Road Density and Location			X		X	
Disturbance History			X		X	
Riparian Reserves			X		X	

LIST OF SPECIES

Endangered: None Listed
Threatened:

A. Columbia Basin Bull trout (*Salvelinus confluentus)*
B. Mid-Columbia Steelhead (*Oncorhynchus mykiss*)
C. Bald eagle *(Haliaeetus leucocephalus)*
D. Ute ladies'-tresses (*Spiranthes diluvialis*)

Proposed: None

(USFWS reference 1-9-01-SP-374, received April 2, 2001, cross reference 1-9-00-SP-163)
(NMFS letter dated March 30, 2000)

DESCRIPTION OF SPECIES AND HABITATS

A. Columbia Basin Bull trout were listed as threatened under the Endangered Species Act effective on July 10, 1998 by the U.S. Fish and Wildlife Service. Bull trout are a wide ranging species that formerly inhabited most of the cold lakes, rivers, and streams throughout the western United States and British Columbia. They are piscivorous and require an abundant supply of forage fish for vigorous populations. They can exhibit four distinct life forms: resident, fluvial, adfluvial, and anadromous. Resident bull trout spend their entire life cycle in the same (or nearby) streams in which they were hatched. Fluvial and adfluvial populations spawn in tributary streams where the young rear from one to four years before migrating to either a lake (adfluvial) system or a river (fluvial) system, where they grow to maturity (Fraley and Shepard, 1989). Anadromous fish spawn in tributary streams, with major growth and maturation occurring in salt water. Bull trout, most likely, occur as resident and fluvial forms in the Touchet River drainage.

Bull trout display a high degree of sensitivity at all life stages to environmental disturbance and have more specific habitat requirements than many other salmonids (Fraley and Shepard, 1989; Rieman and McIntyre, 1993). Bull trout growth, survival, and long-term population persistence appear to be particularly dependent upon five habitat characteristics: cover, channel stability, substrate composition, temperature, and migratory corridors (Rieman and McIntyre, 1993). Preferred spawning habitat consists of low gradient streams with loose, clean gravel (Fraley and Shepard, 1989). Fine sediments can fill spaces between the gravel, thus limiting the dissolved oxygen supply needed by incubating eggs and fry. Residing in the gravel for more than half a year (200 or more days) makes young bull trout especially vulnerable to fine sediments and water quality degradation (Fraley and Shepard, 1989). Successful bull trout spawning and development of embryos and juveniles requires very cold water with spawning occurring below 9°C (48°F) and optimal incubating temperature from 2 to 4°C (35.6° to 39.2°F). Spawning occurs from August through November and eggs hatch in late winter or early spring. Emergence occurs in early April through May, commonly following spring peak flows. Bull trout require complex forms of instream cover. Adults use pools, large woody debris, large boulders, and undercut banks for resting and foraging. Juveniles also live in the streambed cobble and use side channels and woody debris for cover. Water temperatures in excess of 15°C (59°F) can limit bull trout distribution (Rieman and McIntyre, 1993). Bull trout are seldom found in water that is above 20°C (68°F).

A.1 Inventories and Surveys for Bull Trout

The Washington Department of Fish and Wildlife (WDFW) have not found bull trout in Coppei Creek during recent (1998 and 1999) surveys. Bull trout are found within the Touchet River drainage about 20 miles further upstream. Separate populations exist in the North Fork, the Wolf Fork (and Robinson Fork), and in the South Fork Touchet Rivers. These populations appear to be separated and are not known to intermix under

the present conditions. Flows in Coppei Creek are generally low in July through October and moderate to high in the late winter and early spring months. Mendel et. al. (2000) monitored stream temperature and flow conditions during the summer of 1999. Flows dropped below three cubic feet per second from mid-June through September. Mean daily stream temperatures were in excess of 15.6°C (60°F) continuously from mid-June to the end of August, and above 20°C (68°F) for 30 days (non-continuous). Maximum daily temperature exceeded 20°C (68°F) on about 90 days, peaking at 27.8°C (82°F) around the first of August. Graphs of this data are presented in Figures 1 and 2. With continued in-stream habitat and riparian corridor enhancements throughout the basin, bull trout could potentially utilize the upper reaches of Coppei Creek, however, adverse impacts from land development, especially on the upper South Fork may make this difficult.

A.2 Analysis of Effects on Bull Trout

No direct impacts to bull trout would occur. Impacts to potential bull trout habitat, should the species start using Coppei Creek, would be minimal. Existing channel morphology would be unimpacted, except in the area of the bridge replacement and floodwall sections where existing constraints will be moved further away from the stream.

A.3 Management Actions Related to Bull Trout

This project would be designed to minimize impacts to stream and riparian habitat. In-water work for the bridge replacement would take place during the summer when water temperatures are at their highest. Very few cold water fish species of any kind would be in the area at that time. No bull trout are currently found in Coppei Creek. Measures will be taken to minimize impacts to the environment. Other measures listed in the steelhead section will also reduce the potential for impacts to the environment.

1. Use of standard erosion control techniques during construction.
2. Leaving as much native vegetation as possible to provide a buffer.
3. Minimizing the clearing of trees. Re-planting suitable native trees would mitigate unavoidable clearing.

A.4 Conclusion for Bull Trout

Bull trout are not presently using Coppei Creek and stream temperatures are too high to support bull trout in the project reach during the summer. However, they are present within the Touchet River watershed. We conclude that this project "may affect, but is not likely to adversely affect" bull trout or their habitat. Any impacts to potential habitat would not hinder the use of upstream habitat should bull trout begin using Coppei Creek.

B. Mid-Columbia Steelhead were listed as threatened under the Endangered Species Act in March 1999 by the National Marine Fisheries Service (NMFS). Adult steelhead return to their natal streams from December through April to spawn. After spending one or two years rearing in the area, juveniles begin their outmigration to the ocean in April and May when flows are usually higher than average. Optimal steelhead habitat is characterized by clear, cold water with complex cover including large woody debris and boulders. Periodic low flows, flood control measures, irrigation diversions, and habitat destruction limit both adult and juvenile steelhead survival. The upper incipient lethal temperature for adult rainbow/steelhead is 25°C (77°F) (Raleigh et. al. 1984).

Rainbow/steelhead trout are found in Coppei Creek year-round. Steelhead utilize parts of Coppei Creek for spawning, rearing, and migration. Steelhead are the only threatened or endangered species likely to be found in the area.

B.1 Inventories and Surveys for Steelhead

Flows in Coppei Creek are generally low in July through October and moderate to high in the late winter and early spring months. Mendel et. al. (2000) monitored stream temperature and flow conditions during the summer of 1999. Flows dropped below three cubic feet per second from mid-June through September. Mean daily stream temperatures were in excess of 19°C (66.2°F) from the beginning of July to the last week of August, reaching a maximum of around 22°C (72°F). Maximum daily temperature exceeded 25°C (77°F) on 29 days, peaking at 27.8°C (82°F) around the first of August. Even with the high summertime temperatures, juvenile steelhead could be in the area taking cover in shaded pools. During a site visit on 8 August 2000, three, five-inch long rainbow/steelhead were observed under the U.S. 12 bridge.

The North, South, and mainstem Coppei produced a total count of 47 steelhead redds in the 14.2 stream miles surveyed in 1999 (Mendel et. al., 2000). With continued in-stream habitat and riparian corridor enhancements throughout the basin, steelhead use of Coppei Creek could increase.

The habitat information presented earlier in this assessment was collected during July, 2000. Parameters were taken from the Fish and Wildlife Service, Habitat Suitability Information: Rainbow Trout. This information will help to determine the degree of impact from the proposed project and provide a baseline for future reference.

B.2 Analysis of Effects on Steelhead

In-water work during preparation for bridge pier construction would cause a short period of increased turbidity for a short distance downstream. This could have a minor adverse effect on juvenile steelhead downstream. However, because this work would take place in July and August, few steelhead would be in the lower reaches of Coppei Creek due to high water temperatures. The existing stream morphology would not be

changed by the proposed project, except for the floodwall area around the U.S. 12 bridge. In the floodwall area, an existing dike would be lowered, providing an increased area for riparian vegetation establishment. This could have a beneficial effect on habitat. Some existing vegetation including trees may need to be removed near the bridge to allow room for the detour bridge and permanent bridge construction, but the area will be revegetated after completion of construction.

Installation of the temporary channel diversion under the bridge may include a temporary culvert. Installation of the culvert and diversion structure would cause increased turbidity for a short period. Dewatering of the pool under the bridge could also cause a few fish to become stranded. The bridge abutment work would be isolated from the flowing water and would have no direct impacts to fish.

Detailed surveying and floodplain analysis indicate that even the 100 year flow (1% chance flood) will stay within the channel downstream of the project. The Waitsburg sewage treatment plant would not be affected or subjected to flooding caused by the propose project.

B.3 Management Actions Related to Steelhead

This project would be designed to minimize impacts to stream and riparian habitat. In-water work for the bridge replacement would take place during the summer when water temperatures are at their highest. Much of the area would revegetate naturally, but willows could be planted between the floodwall and the bankfull elevation to provide some riparian buffer to the stream. The in-water work window is July 15 to September 30. Few cold water fish species would be in the area at that time. Potential impacts from bridge demolition will be minimized by following established best management practices. Best Management Practices established between the Washington State Department of Transportation and the Washington State Department of Ecology will be followed.

To isolate the stream from the bridge abutments, the stream will be diverted to the center of the bridge or placed in a culvert. If a culvert is used, fish passage will be maintained. A minimum 48" wide culvert would likely be used. The culvert would be buried in the streambed with a natural substrate through the entire culvert. An alternative would be to use a bottomless culvert.

The contractor will be required to collect all debris from the bridge demolition. One method that is typically employed is to lay a geofabric under the bridge deck from abutment to abutment. The geofabric will be anchored in place using sandbags or other retrievable anchors. Water would be allowed to flow over the geofabric. Most of the large debris will be removed from above using excavation equipment. Materials that fall from the bridge will be collected on the geofabric. Once demolition of the bridge deck and above grade structure is completed, the geofabric will be removed with the bridge debris removed also.

The disturbed area will be revegetated following removal of the detour bridge. A staging area at least 50 meters from the creek will be utilized. All heavy equipment refueling, maintenance, and overnight storage will be done in the staging area. Overnight containment berms will be utilized to limit impacts from potential petroleum product spills.

B.4 Conclusion for Steelhead

Because steelhead can be found in Coppei Creek throughout the entire year, we conclude that this project "may affect, and is likely to adversely affect" steelhead or their habitat. These effects should be short term. Negative effects would be reduced as vegetation reestablishes, providing increased shade and cover to the stream.

The main focus on limiting impacts of this project is toward steelhead. WDFW, the Natural Resources Conservation Service, and the Walla Walla Conservation District are involved in projects throughout the Walla Walla watershed, including Coppei Creek, to enhance in-stream and riparian habitat. It is very important that this proposed project does not hinder the ongoing environmental improvement efforts.

C. Bald eagles were listed as threatened under the Endangered Species Act on February 14, 1978 by the U.S. Fish and Wildlife Service. The bald eagle is an uncommon winter resident in the area. Records of sightings within the geographic area have occurred between November and April. Several factors determine whether bald eagles are attracted to a riparian area. One factor is food supply. The second factor is large trees for perching, roosting, and nesting. A few bald eagles sometimes winter along the Touchet River, Mill Creek, and Walla Walla River drainages. The 1999 Audubon Christmas count for Walla Walla sited no bald eagles, but did include two golden eagles. The primary wintering season for bald eagles is November 1st through March 15th. Although some bald eagle nesting has been occurring in the Columbia basin, none has been documented in the Coppei Creek drainage. Bald eagles are primarily piscivorous, but will scavenge for any readily available food source including carrion. In the Columbia River basin, bald eagles feed primarily on fish and waterfowl.

C.1 Inventories and Surveys for Bald Eagles

The proposed project is located on the edge of the town of Waitsburg, WA. No recorded information could be found for sightings of bald eagles in the immediate area. Bald eagles sometimes winter in low numbers near Walla Walla, 20 miles to the southwest and near Dayton, 10 miles to the west.

C.2 Analysis of Effects on Bald Eagles

The work would take place during the summer and early fall. Bald eagles would not be directly impacted. A few trees would need to be removed to construct the setback levee and new bridge. Most of these trees are locust, just upstream of the bridge. A

few willows and alder may also need to be removed. This area is very poor bald eagle habitat.

C.3 Management Actions Related to Bald Eagles

The proposed work is to be completed by mid-November. This would minimize impacts if any bald eagles chose to winter in the area. Disturbed areas will be revegetated with native species. No other special management actions related bald eagles are required.

C.4 Conclusion for Bald Eagles

There would be no direct effects on bald eagles from the proposed work. If bald eagles begin to use the area, it would likely be during the winter. The proposed project would be completed by mid-November. We have concluded that this project would have "no effect" on bald eagles or their habitat.

D. Ute ladies'-tresses were listed under the Endangered Species Act in January 1992. It is an orchid known to inhabit wetland and riparian areas. In Washington it has been found at about 1,500 feet elevation at a site in Okanogan County of the northeastern part of the state and more recently at a lower elevation near Rocky Reach on the Columbia River. In other parts of its range it is found up to about 7,000 feet generally in moist areas in open shrub or grassland. The proposed project location is at about 1,300 feet elevation in the southeastern part of the state.

Positive identification of the plant can only be made while it is flowering. The plant generally flowers during August and September. A survey of the proposed construction site will occur annually prior to the 2003 construction period. The dominance of exotic plant species such as reed canary grass and lack of off-channel wetlands at the site suggests poor habitat conditions for Ute ladies'-tresses. For this reason we conclude that this project "May Affect, but is not likely to Adversely Affect" Ute ladies'-tresses.

D.1 Inventories and Surveys for Ute ladies'-tresses

No Ute ladies'-tresses were observed during the July 11, 2000 site evaluation. Some potential habitat exists, but much is dominated by reed canary grass. Site visits will be conducted during late August in the years prior to the 2003 construction date. If the species is found consultation with the U.S. Fish and Wildlife Service will be reinitiated.

D.2 Analysis of Effects on Ute ladies'-tresses

Most of the work for the setback levee would take place in the dry upland outside of the riparian zone. The area close to the U.S. 12 bridge would impact the riparian zone, but is currently constricted by a riprapped berm. Lowering the berm and installing the flood protection at least 7.6 meters (25 feet) back from the ordinary high water line will allow for an increased riparian area.

D.3 Management Actions Related to Ute ladies'-tresses

It is highly unlikely that Ute ladies'-tresses exist in the proposed project area. No special management actions related to Ute ladies'-tresses are required for this project. Because of the length of time between now and when the project is to be conducted, the area will be surveyed for the presence of Ute ladies'-tresses during late August in 2001 and 2002. If any of the plants are found during those surveys, consultation with the U.S. Fish and Wildlife Service will be reinitiated.

D.4 Conclusion for Ute ladies'-tresses

Because of poor habitat conditions at the proposed project site, but lack of known information about the species in the area, we conclude that this project "May Affect, but is not likely to Adversely Affect" Ute ladies'-tresses.

SUMMARY

Because steelhead could rear in the stream year-round, there is potential for take of a few individuals of this species. We conclude that this proposed project "may affect, and is likely to adversely affect" steelhead. The proposed project could impact Ute ladies'-tresses if it were found to be present in the area. We conclude that this project "may affect, but is not likely to adversely affect" Ute ladies'-tresses. Bull trout could potentially use Coppei Creek in the future. Even if this occurs we conclude that this project "may affect, but is not likely to adversely affect" bull trout. The proposed project would have "no effect" on bald eagles.

Summary table

Columbia Basin Bull trout	May Affect, Not Likely to Adversely Affect
Mid-Columbia Steelhead	May Affect, Likely to Adversely Affect
Bald eagle	No Effect
Ute ladies'-tresses	May Affect, Not Likely to Adversely Affect

REFERENCES

Fraley, J.J. and B.B. Shepard. 1989. Life History, Ecology, and Population Status of Migratory Bull Trout (*Salvelinus confluentus*) in the Flathead Lake and River System, Montana. Northwest Science 63:133-143.

Mendel, G., D. Karl, and T. Coyle. 2000. Assessment of Salmonid Fishes and their Habitat Conditions in the Walla Walla River Basin of Washington: 1999 Annual Report. Washington Dept. of Fish and Wildlife. Report # FPA 00-18. BPA project #98020-00. December.

Raleigh, R.F., T. Hickman, R.C. Solomon, and P.C. Nelson. 1984. Habitat Suitability Information: Rainbow Trout. US Dept. of Interior, Fish and Wildlife Service. FWS/OBS-82/10.60. January.

Rieman, B.E., and J.D. McIntyre. 1993. Demographic and Habitat Requirements for Conservation of Bull Trout. General Technical Report INT-302. USDA Forest Service, Intermountain Research Station, Ft. Collins, Colorado

APPENDIX D

REAL ESTATE

APPENDIX D

REAL ESTATE

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ADDENDUM

APPENDIX D
Real Estate Plan
Coppei Creek Section 205 Project
Waitsburg, Washington

D1.01. GENERAL.

The following narrative imparts a real estate perspective on the proposed Coppei Creek, Section 205 project, in Waitsburg, Washington. In October 1997, the U.S. Army Corps of Engineers (Corps), Walla Walla District, *Walla Walla River Watershed, Oregon and Washington, Reconnaissance Report,* addressed flooding and flood damage reduction improvements in the subject locale, among others. As a result, CECW-BA issued a Work Allowance Report on April 22, 1999, that provided funding to initiate and complete feasibility studies on two projects. One of the projects was subsequently deferred, so the money that had been made available for it was reallocated to begin the Coppei Creek Section 205 feasibility study.

The existing flood damage prevention measures in Waitsburg, Washington, were constructed by local interests or by Federal agencies under emergency conditions. They are not considered permanent or adequate to protect against a 100-year flood event. In February 1996, Coppei Creek experienced a flood discharge equivalent to a 70-year recurrence interval. That event, as determined from high water marks, is estimated to have had a magnitude of about 48.1 cubic meters per second (cms) [1,700 cubic feet per second (cfs)]. An unquantified portion of the discharge flooded over the right bank, upstream of the Coppei Creek Bridge on U.S. Route 12. The overflow proceeded north through the fairgrounds, residential property and along U.S. Route 12, combining with Touchet River floodwaters in downtown Waitsburg. If a 100-year event [approximately 56.6 cms (2,000 cfs)] ever occurs and proper flood control measures are not in place, the town would sustain substantial property damage. The proposed solution includes strategic placement of two setback levees, two retaining walls, and a new bridge at U.S. Route 12 to relieve the existing constriction of flood flows at that crossing. Local opposition to this project is not expected to be great. There may, however, be some resistance to the detour plan for U.S. Route 12, which includes a temporary bridge and its attendant road approach segments. Similarly, one or two property owners may have concerns about the manner in which certain project features would cross their land.

The Waitsburg Coppei Flood Control District (WCFCD) is the non-Federal Sponsor for this project and will be acquiring most of the necessary real estate interests through an interlocal agreement with the City of Waitsburg. The Washington State Department of Transportation (WSDOT) will perform the remaining acquisitions associated with bridge reconstruction and will ultimately assume the operation, maintenance, repair, replacement and rehabilitation (OMRR&R) responsibilities for the new U.S. Route 12 Bridge. Accordingly, a separate agreement will be necessary between the flood control district and WSDOT whereby the OMRR&R for the bridge is separated from those pertaining to all other project features.

D1.02. PROPERTY AND PROJECT DATA.

Waitsburg, Washington (population ±1,200), is a small, rural city located in southeastern Washington's Walla Walla County. Specifically, it is situated on U.S. Route 12, approximately 20 miles north of Walla Walla, Washington, and 140 miles south of Spokane, Washington, at the confluence of Coppei Creek and the Touchet River. All typical public facilities are available. The economic base is primarily derived from agriculture and related industries (*i.e.,* farm chemicals and grain elevators). Local government, schools, and retail/professional businesses also contribute to the local business character.

The proposed flood control initiatives will be located south and southwest of town within Sections 14 and 15, Township 9 North, Range 37 East, W.M., Walla Walla County, Washington. Beginning at the West Seventh Street Bridge and proceeding upstream to U.S. Route 12, the features would include a setback levee corridor measuring ±60 feet wide by ±1,742 feet long and a concrete setback wall corridor measuring ±30 feet wide by ±400 feet long. At U.S. Route 12, the WSDOT bridge across nonnavigable Coppei Creek would be replaced. During that construction, traffic would be detoured for up to 1 year over a temporary bridge and road (approximately ±60 feet by ±300 feet, in aggregate) just upstream/east of the existing highway right-of-way. Also east of the highway, there would be another concrete setback wall corridor measuring about ±30 feet wide by ±462 feet long and another setback levee corridor measuring ±60 feet wide by ±2,132 feet long (a ±600-foot segment of it passes through city-owned land). The corridor would wind south of the fairgrounds and terminate at high ground to its southeast.

Along the project reach, three areas comprising an aggregate ±4.0 acres would be necessary for staging and storage during construction. A ±0.60-acre pasture area near the left bank of Coppei Creek and just east of U.S. Route 12 would be subject to floodwater inundation after completion of the project. No additional provision for access would be required as the features are approached from local public streets and from the levee alignments themselves. The proposed project's impact upon building improvements would be minimal, and no displacements or resettlements under Public Law 91-646 (*Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970*, as amended) are expected. A city-owned steel equipment shed at the fairgrounds would likely have to be moved, and an old privately-owned shed of nominal value would be in the path of a levee segment. There are no known mineral deposits of commercial value, nor is there any known presence of hazardous materials. It is assumed that any required relocations of facilities/utilities would occur "in place." The known facilities/utilities that would either be definitely or potentially impacted include the following:

ITEM	LOCATION
Corporate	
Electricity (Pacific Power)	At U.S. Route 12 Bridge - conduit.
Electricity (Pacific Power)	Pole in path of downstream setback wall (on the Petersen ownership).
Telephone (Qwest/AT&T)	At U.S. Route 12 Bridge - fiber optic line.
City of Waitsburg	
Waterline (1 inch)	About 30 feet downstream/west of U.S. Route 12 Bridge.
Waterline	About 15 feet south of 10th Street, east of highway (on the Broom ownership).
Sewer manhole	About 20 to 30 feet north of bridge and west of highway (on the Petersen ownership).
Sewer line	About 20 to 30 feet north of bridge and east of highway (on the Broom ownership, 10 feet deep).
State of Washington	
U.S. Route 12 Bridge over Coppei Creek (WSDOT).	

Preliminary Attorney's Opinions of Compensability have been prepared and used for the purpose of completing this study. They indicate that the non-Federal Sponsor has a legal obligation to relocate the impacted public utilities/facilities involved as part of its lands, easements, rights-of-way, relocations, and disposal (LERRD) responsibilities. The measure of just compensation is the cost of providing functionally equivalent utilities/facilities in lieu of providing payment of their respective fair market values. The Government will make a final determination of the relocations necessary for the construction, operation, or maintenance of the project after further analysis and completion and approval of final Attorney's Opinions of Compensability for each of the impacted utilities and facilities.

D1.03. REAL ESTATE RECOMMENDATIONS.

It is estimated that, in aggregate, 12 private fee simple ownerships would be impacted by this proposed project. In order to facilitate project construction, operation, and maintenance, it is recommended that a standard flood protection levee easement be acquired over ±5.0 acres (eight owners) where the two setback levees would be located. It is also recommended that the ±0.60 acre needed for concrete setback walls (five owners) be acquired under a channel improvement easement moderately tailored to address said structures. During construction, standard temporary work area easements encompassing ±4.0 acres (three owners) are recommended for the upstream and downstream limits of the project reach and centrally where bridge replacement would take place. Similarly, temporary road easements (two owners) are recommended over the ±0.50-acre area east of U.S. Route 12 where traffic would be detoured during bridge construction. The duration of the two aforementioned temporary

estates would be for approximately 1 year. Lastly, as construction of the flood protection measures would cause inundation of a ±0.60-acre site on the south shore (one owner) during high water events, it is recommended that a standard flowage easement (occasional flooding) be acquired over that area. Aerial photography showing a schematic overlay of the above-described areas that are proposed for acquisition and copies of the recommended easement estates therein are in the addendum to this Real Estate Appendix. The levee alignment would pass beneath electric power lines at two, possibly three locations. To legitimize said passage, a Consent to Easement Structures should be secured from the effected power company prior to mobilization. The borrow materials needed to construct this project would be secured separately from locally available commercial sources. Project requirements do not include any additional acquisition of real estate interests for disposal of debris, *etc.*

D1.04. REAL ESTATE COSTS.

The costs associated with project LERRD areas are estimated below:

LANDS AND DAMAGES

.01 LOCAL SPONSOR COSTS			
LAND			
Levee Easements	8	$31,520	
Channel Improvement Easements	5	12,930	
Flowage Easement	1	900	
Temp Work Easements	3	2,000	
Temp Road Easements	2	1,800	
IMPROVEMENTS			
	City shed (incl. in contingency)		
	1-old shed	0	
	Subtotal	$49,150	
	Contingency (20%)	9,850	
	Subtotal		$ 59,000
ADMINISTRATION			
Mapping and Surveying		$22,000	
Title Evidence		5,000	
Appraisal		15,000	
Relocation Agreement Negotiations		5,000	
Negotiation and Closing		20,000	
Public Law 91-646 (Title III)		1,500	
	Subtotal	$68,500	
	Contingency (20%)	13,700	
	Subtotal		$ 82,200
GOVERNMENT COSTS			
ADMINISTRATION			
Federal review and assistance		$18,000	
	Contingency (20%)	3,600	
	Subtotal		$ 21,600
TOTAL PROJECT REAL ESTATE COSTS	*(2001 dollars)*		**$162,800****

**NOTE: A 20 percent contingency has been added to the items comprising the TOTAL PROJECT REAL ESTATE COSTS. This allows for negotiation latitude and the passage of time between this report and actual real estate acquisition.

REAL ESTATE MILESTONES AFTER STUDY

Activity	Corps Initiate	Corps Complete	LS [1] Initiate	LS Complete
Execution of PCA [2]		06-03-02 (forecast)		06-03-02 (forecast)
Formal transmittal of final R-O-W [3] drawings to LS and instruction to acquire LERRD		PCA+1/4 mo. [4]		
Prepare mapping			PCA+1/4 mo.	PCA+1 1/4 mo.
Obtain title evidence			PCA+1/4 mo.	PCA+1 mo.
Obtain tract appraisals			PCA+1 1/4 mo.	PCA+2 3/4 mo.
Review tract appraisals	PCA+2 3/4 mo.	PCA+3 1/4 mo.		
Conduct negotiations			PCA+31/4 mo.	PCA+9 1/4 mo.
Obtain possession				PCA+9 1/2 mo.

NOTE: The non-Federal Sponsor has been advised of its Public Law 91-646 responsibilities (should the need arise) and the requirement for documenting expenses for crediting purposes. The non-Federal Sponsor has also been notified of the risks associated with acquiring any land interests prior to PCA execution and the Government's formal notice to proceed. Acquisition Capability Checklists from the non-Federal Sponsor, WCFCD; the WSDOT; and the City of Waitsburg are in the addendum to this Real Estate Appendix for information and reference.

[1] LS = Local Sponsor
[2] PCA = Project Cooperation Agreement
[3] R-O-W = Right-of-Way
[4] Mo. = Months

APPENDIX D

REAL ESTATE

ADDENDUM

Table of Contents

RECOMMENDED ESTATES – COPPEI CREEK PROJECT

FLOOD PROTECTION LEVEE EASEMENT.

A perpetual and assignable right and easement in (the land described in Schedule A) (Tracts Nos. _____, _____, and _____) to construct, maintain, repair, operate, patrol and replace a flood protection levee, including all appurtenances thereto; reserving, however, to the owners, their heirs and assigns, all such rights and privileges in the land as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

CHANNEL IMPROVEMENT EASEMENT

A perpetual and assignable right and easement to construct, operate, and maintain channel improvement works including, but not limited to, concrete setback walls and appurtenances thereto on, over and across (the land described in Schedule A) (Tracts Nos. _____, _____, and_____) for the purposes as authorized by the Act of Congress approved_____________, including the right to clear, cut, fell, remove and dispose of any and all timber, trees, underbrush, buildings, improvements and/or other obstructions therefrom; to excavate, dredge, cut away, and remove any or all of said land and to place thereon dredge or spoil material; and for such other purposes as may be required in connection with said work of improvement; reserving, however, to the owners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

FLOWAGE EASEMENT (Occasional Flooding)

The perpetual right, power, privilege and easement occasionally to overflow, flood and submerge (the land described in Schedule A) (Tracts Nos. _____, _____, and _____) (and to maintain mosquito control) in connection with the operation and maintenance of the __________ project as authorized by the Act of Congress approved ___________, together with all right, title and interest in and to the structures and improvements now situate on the land, except fencing (and also excepting ___________ (here identify those structures not designed for human habitation which the District Engineer determines may remain on the land)) 4/; provided that no structures for human habitation shall be constructed or maintained on the land, that no other structures shall be constructed or maintained on the land except as may be approved in writing by the representative of the United States in charge of the project, and that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of landfill; 3/ the above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used and enjoyed without interfering with the use of the project for the purposes authorized by Congress or abridging the rights and easement hereby acquired; provided further that any use of the land shall be subject to Federal and State laws with respect to pollution.

3/ If sand and gravel or other quarriable material is in the easement area and the excavation thereof will not interfere with the operation of the project, the following clause will be added: "excepting that excavation for the purpose of quarrying (sand) (gravel) (etc.) shall be permitted, subject only to such approval as to the placement of overburden, if any, in connection with such excavation;"

4/ Where substantial residential structures exist in areas subject to very infrequent flooding, and will not interfere with project operations, the following clause may be substituted "(and also excepting the structure(s) now existing on the land, described as _____, which may be maintained on the land provided that no portion of the structure(s) located below _____ feet, mean sea level, shall be utilized for human habitation to the extent that sleeping accommodations will be maintained therein)". The next clause would then be modified to read " provided that no other structures for. . . . ." that no excavation shall be conducted and no landfill placed on the land without such approval as to the location and method of excavation and/or placement of landfill; 3/ the above estate is taken subject to existing easements for public roads and highways, public utilities, railroads and pipelines; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be enjoyed without interfering with the use of the project for the purposes authorized by Congress or abridging the rights and easement hereby acquired; provided further that any use of the land shall be subject to Federal and State laws with respect to pollution.

TEMPORARY WORK AREA EASEMENT

A temporary easement and right-of-way in, on, over and across (the land described in Schedule A) (Tracts Nos. _____, _____, and _____), for a period not to exceed ___________, beginning with date possession of the land is granted to the United States, for use by the United States, its representatives, agents, and contractors as a (borrow area) (work area), including the right to (borrow and/or deposit fill, spoil and waste material thereon) (move, store and remove equipment and supplies, and erect and remove temporary structures on the land and to perform any other work necessary and incident to the construction of the _____________ Project, together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions, and any other vegetation, structures, or obstacles within the limits of the right-of-way; reserving, however, to the landowners, their heirs and assigns, all such rights and privileges as may be used without interfering with or abridging the rights and easement hereby acquired; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

TEMPORARY ROAD EASEMENT

A temporary easement and right-of-way in, on, over and across (the land described in Exhibit ____) (Tract No. ____), for a period not to exceed ________, beginning with the date possession of the land is granted to the Grantee, for use by the Grantee, its representatives, agents, contractors and assigns for the location, construction, operation, maintenance, and alteration of a road (and appurtenances thereto); together with the right to trim, cut, fell and remove therefrom all trees, underbrush, obstructions and other vegetation, structures or obstacles within the limits of the right-of-way; reserving, however, to the owners, their heirs and assigns, the right to cross over or under the right-of-way as access to their adjoining land; subject, however, to existing easements for public roads and highways, public utilities, railroads and pipelines.

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY FOR Coppei Flood Control Dist. PROJECT

YES	NO	
X		a. Does the non-Federal Sponsor have legal authority to acquire and hold title to real property for project purposes? Cite statutory authority: RCW 86.09.148, 151
X		b. Does the non-Federal sponsor have the power of eminent domain for this project? Cite statutory authority: RCW 86.09.202, RCW 8.20
	X	c. Does the non-Federal sponsor have "quick-take" authority for this project? Cite statutory authority:
	X	d. Are there any lands/interests in land required for the project that are located outside the non-Federal sponsor's political boundary?
	X	e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? (If "yes", provide description on attached sheets.)

PREPARED BY:

William E. Bloor
Attorney for Non-Federal Sponsor

Date: June 28, 2001

Telephone: (509)- 337-8133
Mailing Address:
P.O. Box 428
Waitsburg, WA 99361

REVIEWED AND APPROVED:

Richard Carlton
Chief, Real Estate Division

Date: 7/19/01

NOTE: Sponsor intends to enter into an inter local agreement with the City of Waitsburg under which the City staff will handle most of the RE: tasks. These questions are answered on the premise that inter local agreement.

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY

YES	NO	
	X	a. Will the sponsor's in-house staff require training to become familiar with real estate requirements of Federal projects including P.L. 91-646, as amended?
		b. If the answer to a. above is "yes", has a reasonable plan been developed to provide such training? (If "yes", provide description on attached sheets.)
X		c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project?
X		d. Is the sponsor's projected in-house staffing level sufficient considering its other work load?
X		e. Can the sponsor obtain contractor support, if required, in a timely fashion?
X		f. Will the sponsor likely request USACE assistance, if available, in acquiring real estate?
X		g. Will the sponsor's staff be located within reasonable proximity to the project site?
X		h. Is the sponsor confident it can provide real estate in time to meet contract advertising dates for the project? If "No", provide explanation on an attached sheet.

PREPARED BY:

Dan G. Bickelhaupt

Dan Bickelhaupt, Chairman
Sponsor Representative
Date: June 28, 2001
Telephone: 509 337-8170
Mailing Address: Shop 337-6563
P.O. Box 685
Waitsburg, WA 99361

REVIEWED AND APPROVED:

Richard Carlton

Richard Carlton
Chief, Real Estate Division
Date: 7/19/01

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY

With regard to this project, the sponsor is anticipated to be (check one):

	Highly Capable
	Fully Capable
X	Moderately Capable
	Marginally Capable
	Insufficiently Capable (provide explanation on attached sheet)

Yes	No	NA	
		X	a. Has the sponsor performed satisfactorily on other USACE projects?
X			b. Has this assessment been coordinated with the sponsor?
X			c. Does the sponsor concur with this assessment? (If "No", provide explanation on attached sheet.)

Richard Carlton

Richard Carlton
Chief, Real Estate Division

Date: 20 July 2001

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY FOR Copper Creek Flood Control PROJECT

YES	NO	
X		a. Does the non-Federal Sponsor have legal authority to acquire and hold title to real property for project purposes? Cite statutory authority:
X		b. Does the non-Federal sponsor have the power of eminent domain for this project? Cite statutory authority:
	X	c. Does the non-Federal sponsor have "quick-take" authority for this project? Cite statutory authority:
	X	d. Are there any lands/interests in land required for the project that are located outside the non-Federal sponsor's political boundary?
	X	e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? (If "yes", provide description on attached sheets.)

PREPARED BY:

Attorney for Non-Federal Sponsor

Date: 8/22/00

Telephone: ( ) 360-753-1622
Mailing Address: Attorney General's Office
PO 40113
Olympia, WA 98504

REVIEWED AND APPROVED:

Richard Carlton
Chief, Real Estate Division

Date: 8/30/00

Washington State Department of Transportation

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

YES	NO	
	✓	a. Will the sponsor's in-house staff require training to become familiar with real estate requirements of Federal projects including P.L. 91-646, as amended?
		b. If the answer to a. above is "yes", has a reasonable plan been developed to provide such training? (If "yes", provide description on attached sheets.)
✓		c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project?
✓		d. Is the sponsor's projected in-house staffing level sufficient considering its other work load?
✓		e. Can the sponsor obtain contractor support, if required, in a timely fashion?
	✓	f. Will the sponsor likely request USACE assistance, if available, in acquiring real estate?
✓		g. Will the sponsor's staff be located within reasonable proximity to the project site?
✓		h. Is the sponsor confident it can provide real estate in time to meet contract advertising dates for the project? If "No", provide explanation on an attached sheet.

PREPARED BY: Larry L H

LARRY L. HOOK
Sponsor Representative
Date: 8-21-00
Telephone: (509) 577-1651
Mailing Address:
WSDOT
PO BOX 12560
YAKIMA, WA 98909

REVIEWED AND APPROVED:

Richard Carlton
Richard Carlton
Chief, Real Estate Division
Date: 8/30/00

D-A-10

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

With regard to this project, the sponsor is anticipated to be (check one):

X	Highly Capable
	Fully Capable
	Moderately Capable
	Marginally Capable
	Insufficiently Capable (provide explanation on attached sheet)

Yes	No	NA	
X			a. Has the sponsor performed satisfactorily on other USACE projects?
	X		b. Has this assessment been coordinated with the sponsor?
		X	c. Does the sponsor concur with this assessment? (If "No", provide explanation on attached sheet.)

Richard Carlton

Richard Carlton
Chief, Real Estate Division

Date: 8/30/00

ASSESSMENT OF NON-FEDERAL SPONSOR'S REAL ESTATE ACQUISITION CAPABILITY FOR Coppei Creek - Waitsburg PROJECT

YES	NO	
X		a. Does the non-Federal Sponsor have legal authority to acquire and hold title to real property for project purposes? Cite statutory authority: RCW 35.21.010 and Charter Sections 2 and 21
X		b. Does the non-Federal sponsor have the power of eminent domain for this project? Cite statutory authority: Chapter 8.12 RCW and Charter Sections 6 and 135
	X	c. Does the non-Federal sponsor have "quick-take" authority for this project? Cite statutory authority: RCW 8.12 applies to Washington cities. These statutes do provide for expidited **
X		d. Are there any lands/interests in land required for the project that are located outside the non-Federal sponsor's political boundary?
	X	e. Are any of the lands/interests in land required for the project owned by an entity whose property the sponsor cannot condemn? (If "yes", provide description on attached sheets.)

** acquisition of real estate in certain instances, but this is probably not the equivelant of the "quick-take" authority available under federal law.

PREPARED BY:

William E. Bloor
Attorney for Non-Federal Sponsor

Date: October 29, 1999

Telephone: (509 337-8133
Mailing Address:
P. O. BOX 428
Waitsburg, WA 99361

REVIEWED AND APPROVED:

Richard Carlton
Richard Carlton
Chief, Real Estate Division

Date: 2 Nov. 1999

City of Waitsburg

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

YES	NO	
	X	a. Will the sponsor's in-house staff require training to become familiar with real estate requirements of Federal projects including P.L. 91-646, as amended?
		b. If the answer to a. above is "yes", has a reasonable plan been developed to provide such training? (If "yes", provide description on attached sheets.)
X		c. Does the sponsor's in-house staff have sufficient real estate acquisition experience to meet its responsibilities for the project?
X		d. Is the sponsor's projected in-house staffing level sufficient considering its other work load?
X		e. Can the sponsor obtain contractor support, if required, in a timely fashion?
X		f. Will the sponsor likely request USACE assistance, if available, in acquiring real estate?
X		g. Will the sponsor's staff be located within reasonable proximity to the project site?
X		h. Is the sponsor confident it can provide real estate in time to meet contract advertising dates for the project? If "No", provide explanation on an attached sheet.

PREPARED BY:
H. V. Zuger
H. V. Zuger, Mayor
Sponsor Representative
Date: October 29, 1999
Telephone: (509)-337-6371
Mailing Address:
P.O. BOX 35
Waitsburg, WA 99361

REVIEWED AND APPROVED:
Richard Carlton
Richard Carlton
Chief, Real Estate Division
Date: 2 Nov 1999

ASSESSMENT OF NON-FEDERAL SPONSOR'S
REAL ESTATE ACQUISITION CAPABILITY

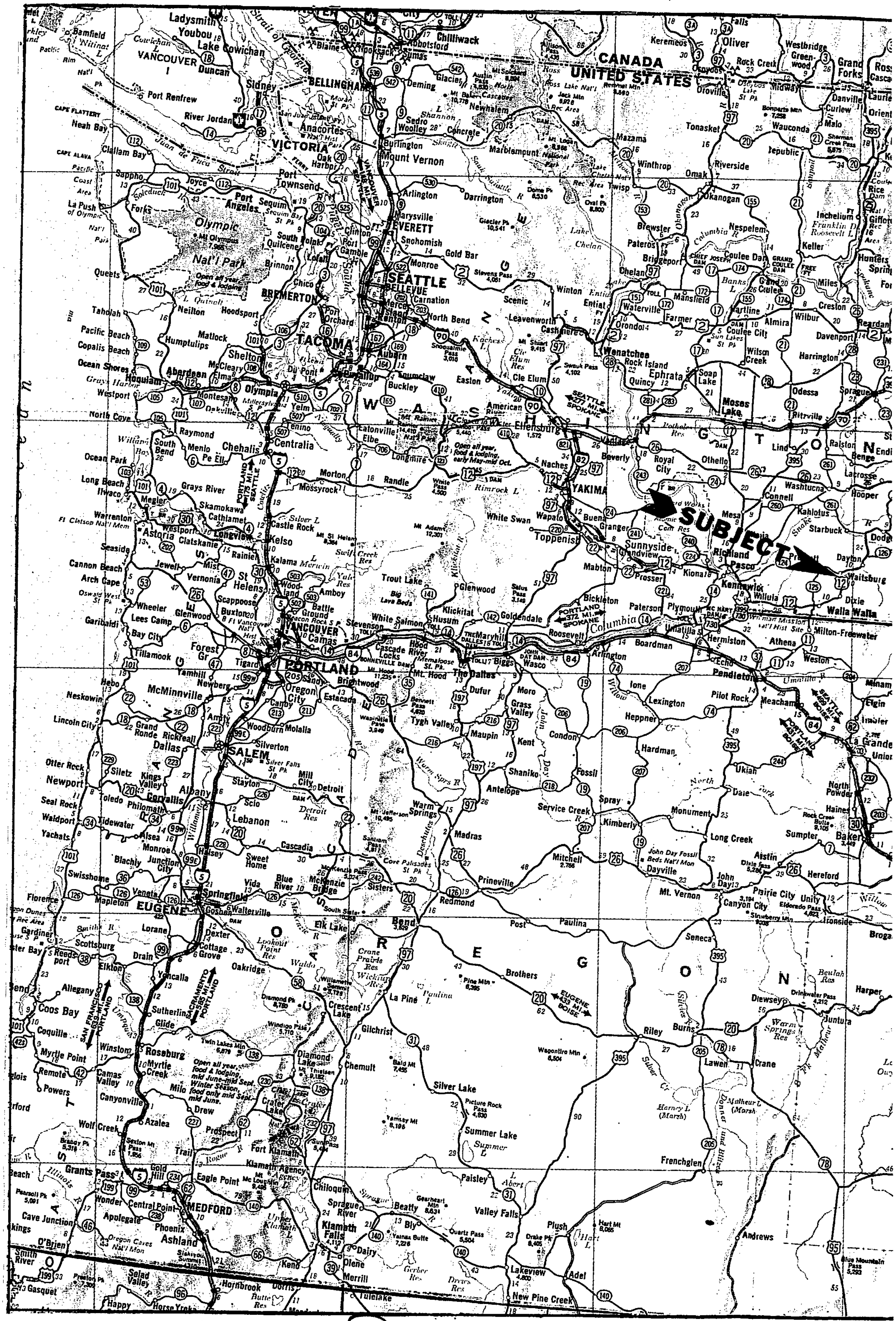
With regard to this project, the sponsor is anticipated to be (check one):

	Highly Capable
	Fully Capable
X	Moderately Capable
	Marginally Capable
	Insufficiently Capable (provide explanation on attached sheet)

Yes	No	NA	
X			a. Has the sponsor performed satisfactorily on other USACE projects?
X			b. Has this assessment been coordinated with the sponsor?
X			c. Does the sponsor concur with this assessment? (If "No", provide explanation on attached sheet.)

Richard Carlton
Chief, Real Estate Division

Date: 2 Nov. 1999


CANADA
UNITED STATES
SUBJECT
VICTORIA
BELLINGHAM
SEATTLE
BELLEVUE
EVERETT
TACOMA
Olympia
BREMERTON
Port Angeles
Olympic Nat'l Park
Aberdeen
Hoquiam
Centralia
Chehalis
Longview
Kelso
Astoria
VANCOUVER
PORTLAND
Salem
Albany
Corvallis
Eugene
Springfield
Roseburg
Grants Pass
Medford
Ashland
Klamath Falls
Bend
Redmond
Madras
Prineville
The Dalles
Hood River
Goldendale
Yakima
Toppenish
Sunnyside
Grandview
Prosser
Richland
Pasco
Kennewick
Walla Walla
Waitsburg
Dayton
Pendleton
Hermiston
Umatilla
Ellensburg
Wenatchee
Moses Lake
Ephrata
Othello
Ritzville
Okanogan
Omak
Chelan
Burns
Lakeview
Baker
La Grande
John Day
Canyon City
Newport
Coos Bay
Tillamook
McMinnville
Mt. Hood
Crater Lake
W A S H I N G T O N
O R E G O N

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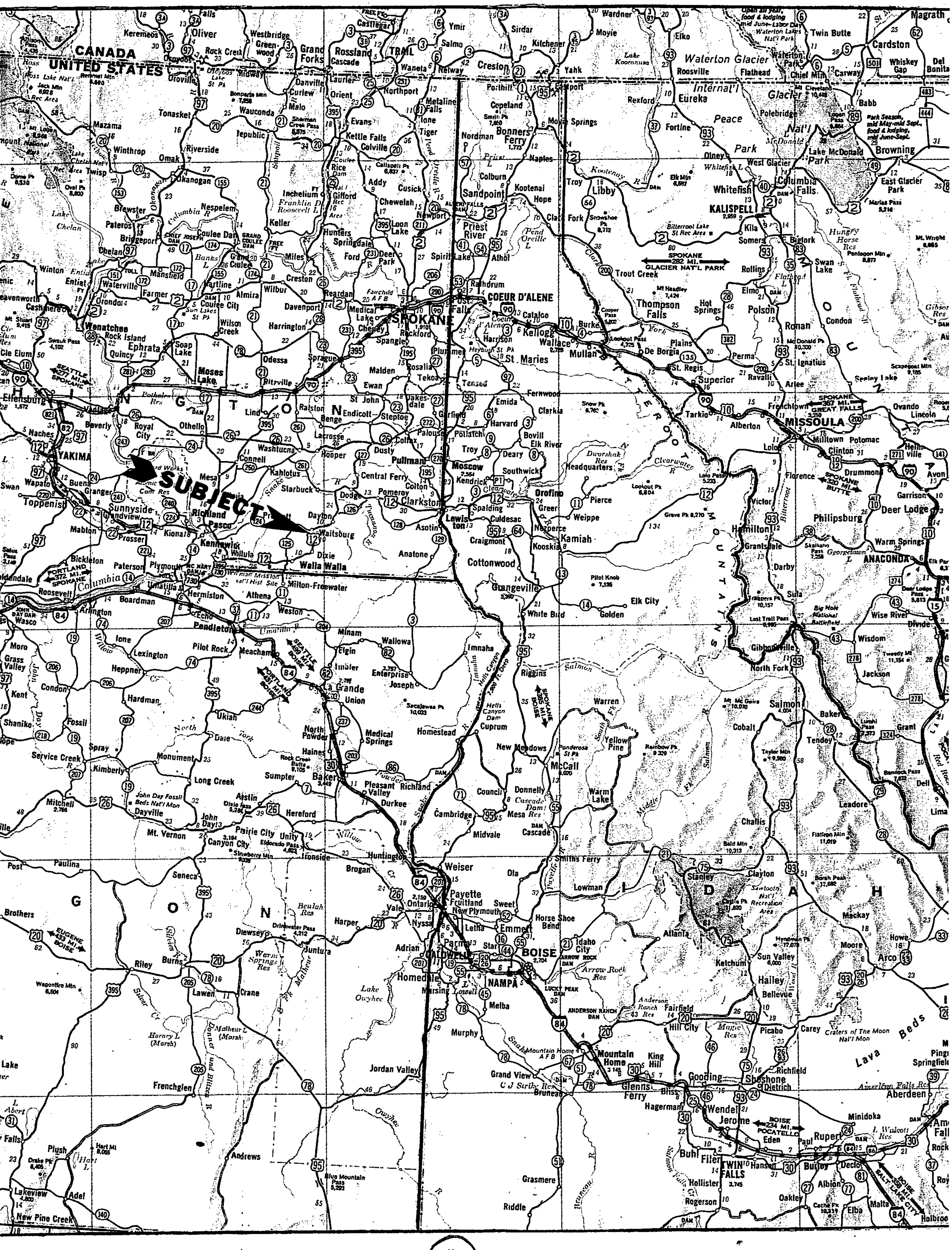
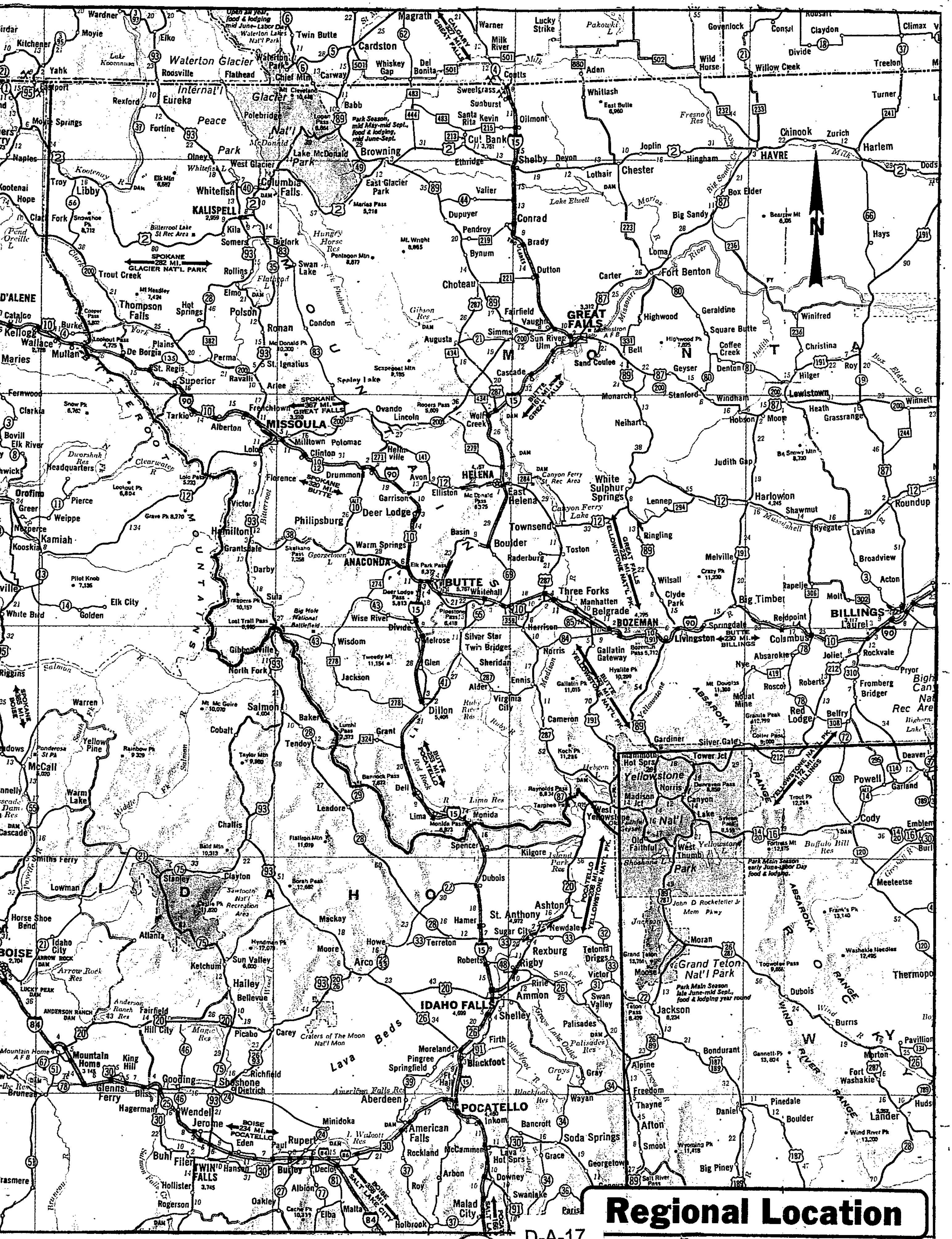


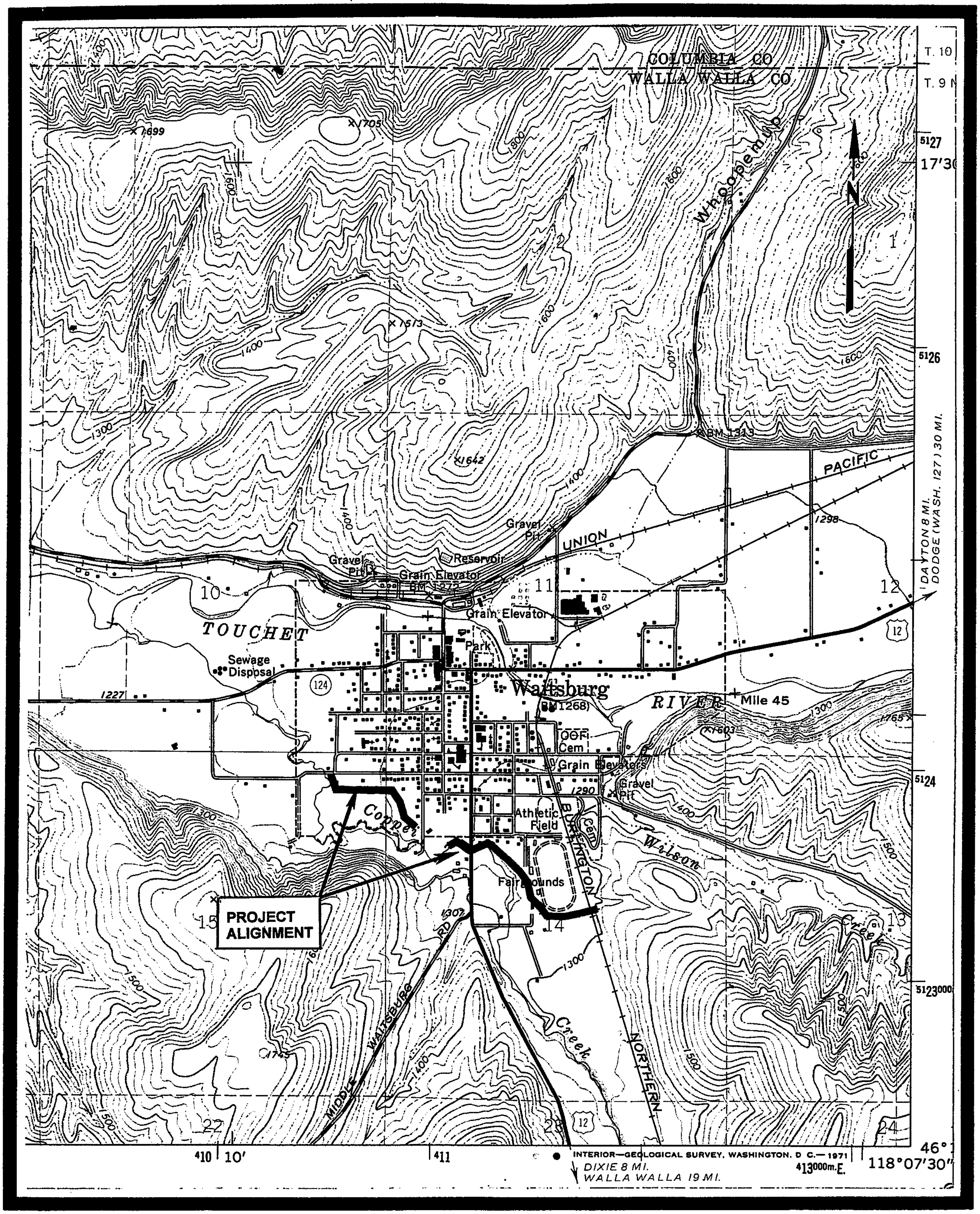
CANADA
UNITED STATES
SUBJECT
SPOKANE
COEUR D'ALENE
MISSOULA
KALISPELL
YAKIMA
Richland
Pasco
Kennewick
Walla Walla
Waitsburg
Dayton
Prescott
Lewiston
Clarkston
Moscow
Pullman
Pendleton
La Grande
Baker
BOISE
NAMPA
CALDWELL
Ontario
Weiser
Twin Falls
Mountain Home
Waterton Glacier Internat'l Peace Park
Glacier Nat'l Park
BITTERROOT MOUNTAINS
SPOKANE 282 MI. GLACIER NAT'L PARK
SPOKANE 367 MI. GREAT FALLS
SPOKANE 320 MI. BUTTE
SPOKANE 385 MI. BOISE
SEATTLE 277 MI. SPOKANE
PORTLAND 372 MI. SPOKANE
SEATTLE 469 MI. BOISE
PORTLAND 426 MI. BOISE
EUGENE 433 MI. BOISE
BOISE 234 MI. POCATELLO
BOISE 358 MI. SALT LAKE CITY



Regional Location

D-A-17

3



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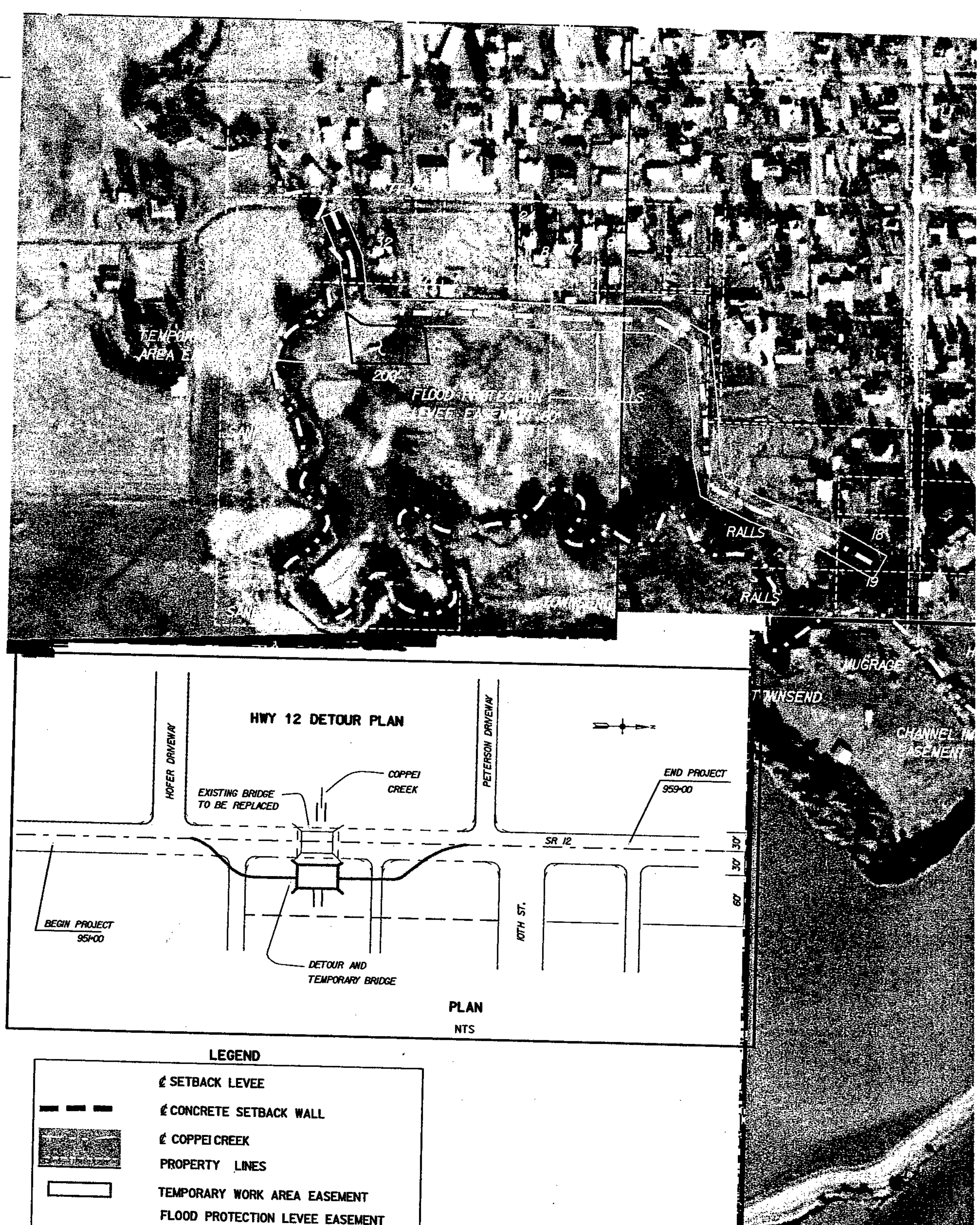
Vicinity Map

CORPS OF ENGINEERS



LEGEND

	℄ SETBACK LEVEE
	℄ CONCRETE SETBACK WALL
	℄ COPPEI CREEK
	PROPERTY LINES
	TEMPORARY WORK AREA EASEMENT
	FLOOD PROTECTION LEVEE EASEMENT
	CHANNEL IMPROVEMENT EASEMENT
	FLOWAGE EASEMENT
	TEMPORARY ROAD EASEMENT (DETAIL ABOVE)

PLAN - PROJECT ALIG

200'

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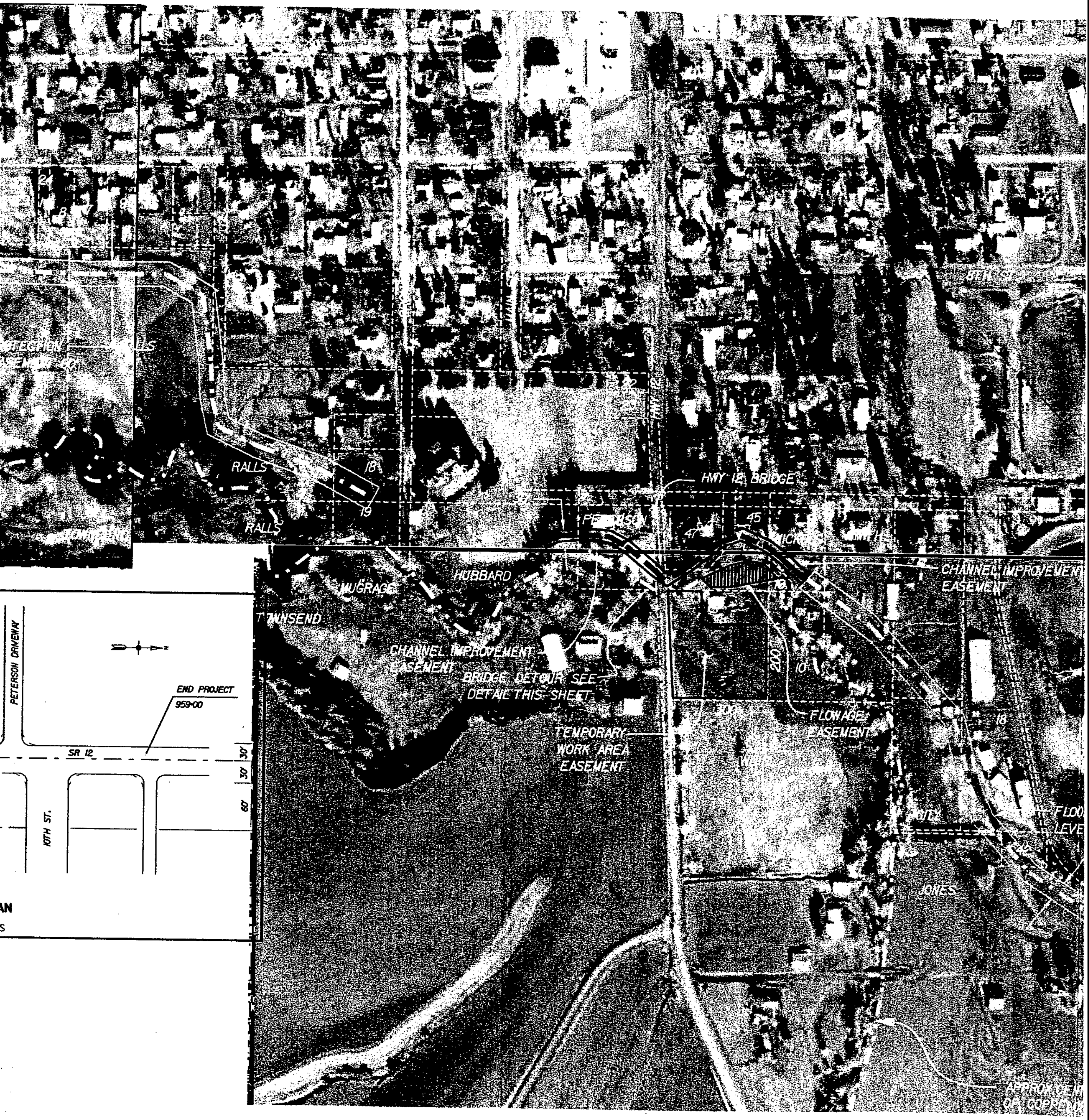


PLAN - PROJECT ALIGNMENT AND PROPOSED EASEMENTS

SCALE IN FEET
200' 0 200'

COMPUTER AIDED DESIGN & DRAFTIN

REFERENCE FILES ATTACHED LEVELS

Y PAYS

U. S. ARMY

AND PROPOSED EASEMENTS

FEET

200'

COMPUTER AIDED DESIGN & DRAFTING

REVISION	DATE	DESCRIPTION	CHKD.	APPR.

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED BY
DRAWN BY
CHECKED BY
SUPERVISED:
CHIEF SUBMITTED:
CHIEF RECOMMENDED:

WALLA WALLA RIVER BASIN
WAITSBURG, WASHINGTON
COPPEI CREEK FLOOD CONTROL STUDY
REAL ESTATE PLANNING MAP

APPROVED: DATE
SCALE AS SHOWN | INV. NO.
SHEET NO. | FILE NO.

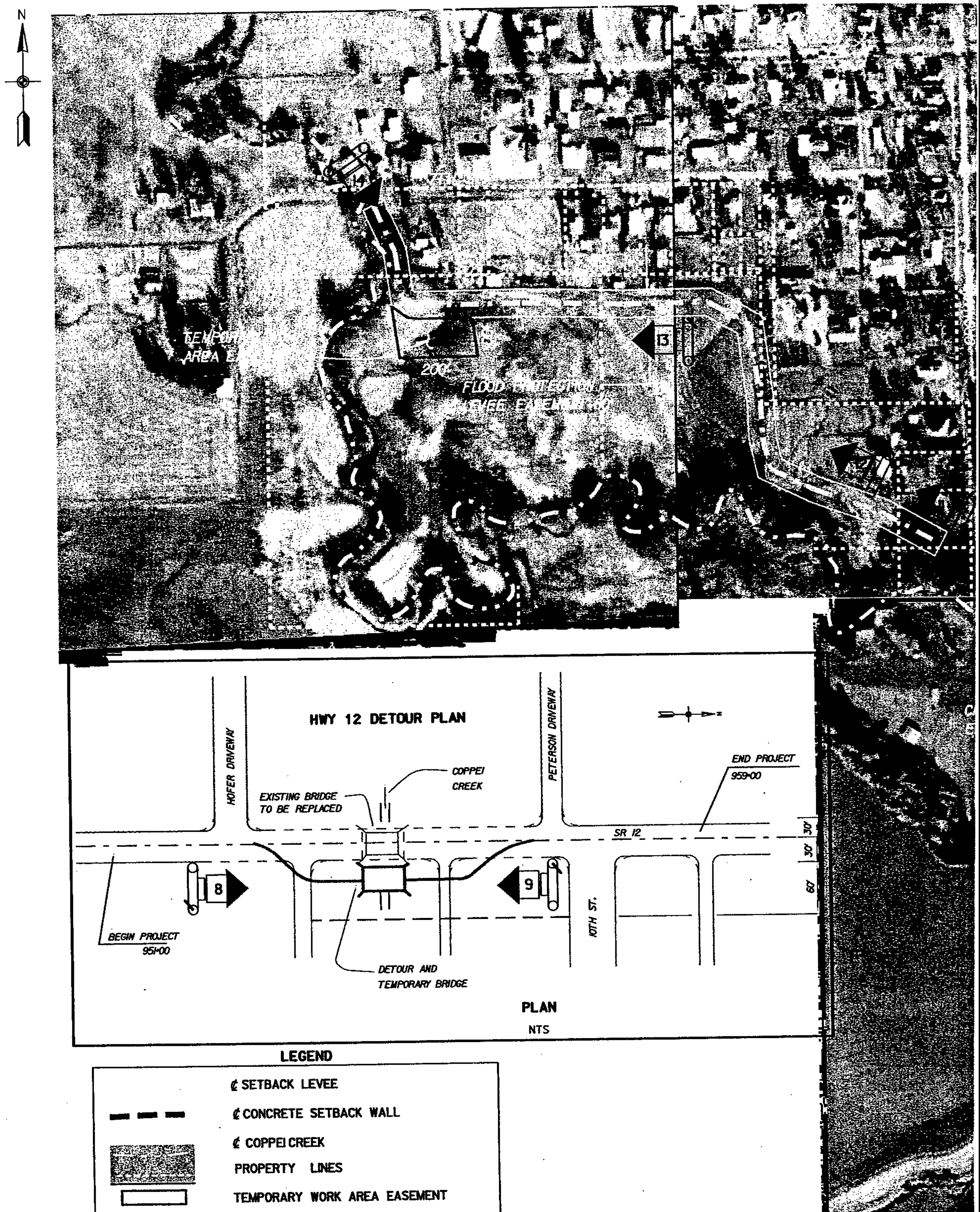
ERING PAYS

D-A-19

REFERENCE FILES ATTACHED LEVELS DRWGS SCALE

MAY-2001 09:02

CORPS OF ENGINEERS

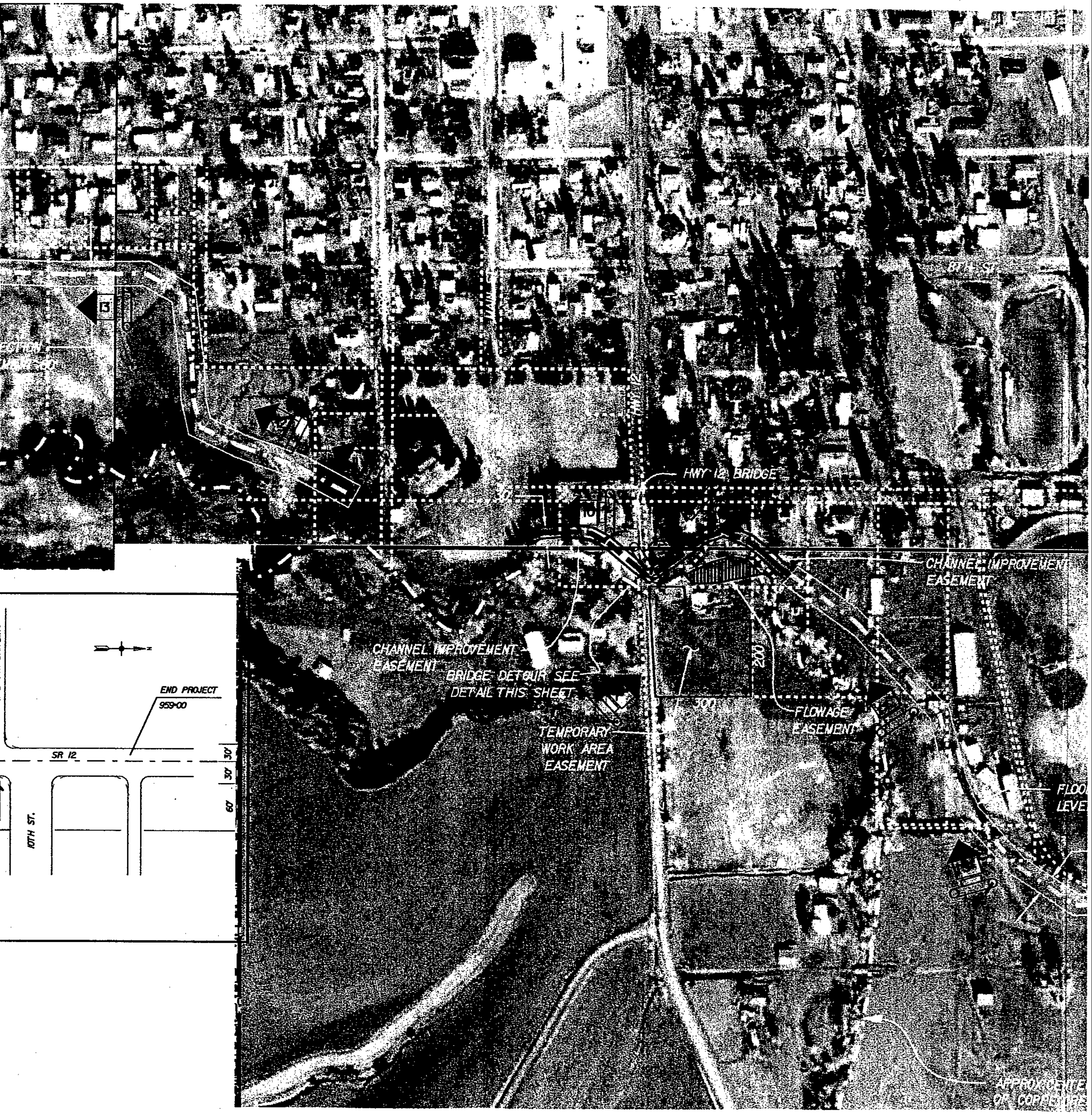


LEGEND

- ℄ SETBACK LEVEE
- ℄ CONCRETE SETBACK WALL
- ℄ COPPEI CREEK
- PROPERTY LINES
- TEMPORARY WORK AREA EASEMENT
- FLOOD PROTECTION LEVEE EASEMENT
- CHANNEL IMPROVEMENT EASEMENT
- FLOWAGE EASEMENT
- TEMPORARY ROAD EASEMENT (DETAIL ABOVE)
- 10 CAMERA POSITION AND ANGLE

1

PROJECT ALIGNMENT ANI



PROJECT ALIGNMENT AND LOCATION/DIRECTION OF SUBJECT PHOTOGRAPHS

SCALE IN FEET
200' 0 200'

2

COMPUTER AIDED DESIGN & DRAFTING

REFERENCE FILES ATTACHED LEVELS

Y PAYS

U. S. ARMY

DIRECTION OF SUBJECT PHOTOGRAPHS

N FEET

200'

3

REVISION	DATE	DESCRIPTION	CHKD.	APPR.

U . S . ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED BY
DRAWN BY CADD DRAWN
CHECKED BY
SUPERVISED:
CHIEF SUBMITTED:
CHIEF RECOMMENDED:

WALLA WALLA RIVER BASIN
WAITSBURG, WASHINGTON
COPPEI CREEK FLOOD CONTROL STUDY
REAL ESTATE PLANNING MAP

APPROVED: DATE

SCALE AS SHOWN | INV. NO.
SHEET NO. | FILE NO

COMPUTER AIDED DESIGN & DRAFTING
DESIGN FILENAME

EERING PAYS

D-A-20

REFERENCE FILES ATTACHED

LEVELS ON FOR CONTRACT DRWGS

SCALE L:\usr9\cad\wstb\realstate2.dgn

1. Temporary work area easement site at upper end of the project. View is northwesterly. Fairgrounds track is at left-center of photograph. Access from 8th Street is along the powerline behind vehicle.

2. Upstream levee alignment looking west along the southerly end of the fairgrounds.

3. Upstream levee alignment looking north-northwesterly along west side of fairgrounds. Arrow shows city equipment shed that will be moved.

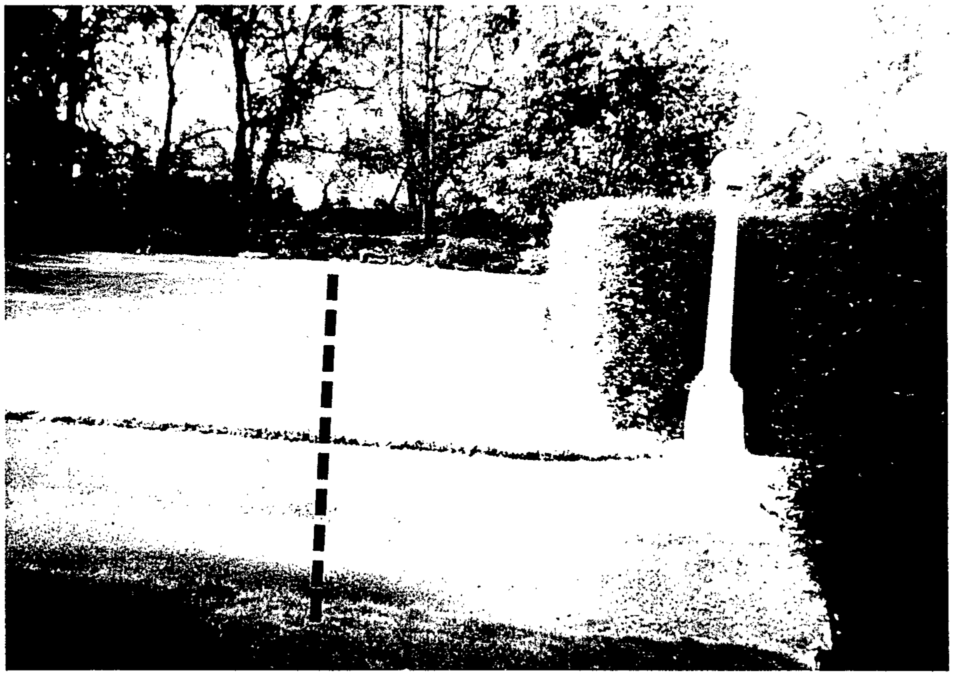
4. Upstream levee alignment looking northwesterly.

5. Concrete setback wall alignment (channel improvement easement area) looking northeasterly. View is upstream from the east abutment of Highway 12 Bridge.

6. Concrete setback wall alignment (channel improvement easement area) looking southeasterly. This view is from the distant end of Photograph No. 5.

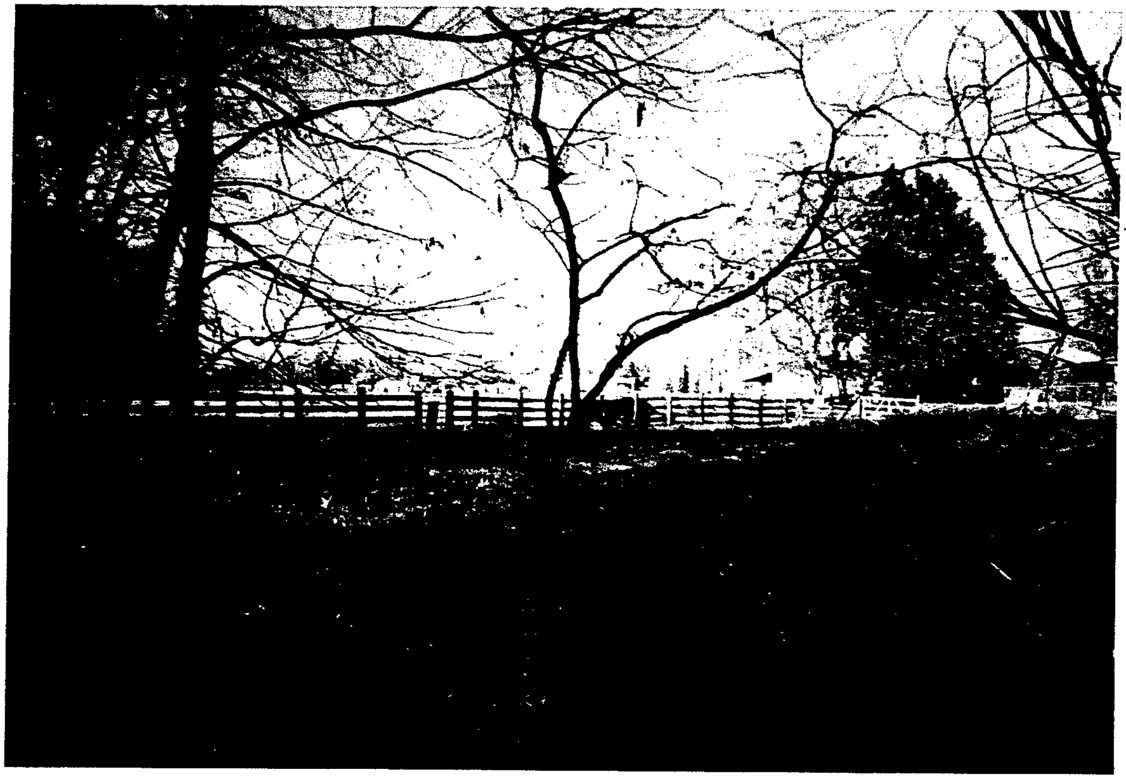
7. Northeasterly view from the east abutment of Highway 12. The temporary work area easement site attending bridge reconstruction lies within the foreground pasture and the flowage easement area is located nearer to the tree line.

8. Temporary road easement alignment on the east side of Highway 12 and the south side of Coppei Creek. View is to the north.

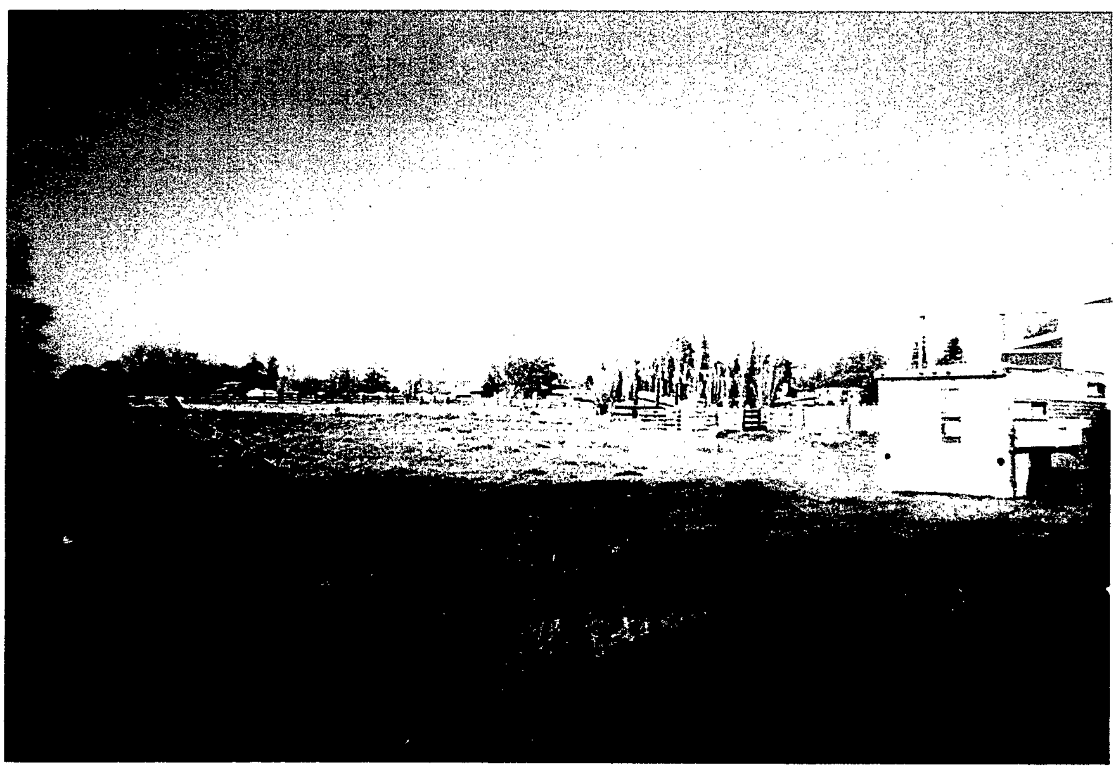


9. Temporary road easement alignment on east side of Highway 12 and the north side of Coppei Creek. View is to the south.

10. Concrete setback wall alignment (channel improvement easement area) looking west . View is downstream from the west abutment of Highway 12.



11. Downstream levee alignment. View is westerly from a point about 100-feet west of Orchard Street.



12. Downstream levee alignment. View is westerly, continuing from the fence in Photograph No. 11.

13. Downstream levee alignment. View is to the west. The arrow shows the approximate location of the temporary work area easement site at the lower end of the project.

14. Downstream levee alignment from its termination at West 7th Street. View is southerly.

APPENDIX E

COST ESTIMATE

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE Section 205 Study - Quantities generated by InRoads., DATED: 23 NOV 99

PROJECT: Coppei Creek Flood Control Project Alternative 1, Revision #1
LOCATION: Waitsburg, WA

DISTRICT: Walla Walla
P.O.C.: KIM CALLAN, CHIEF, COST ENGINEERING

ACCOUNT NUMBER	FEATURE DESCRIPTION	CURRENT MCACES ESTIMATE PREPARED: 15 DEC 99 EFFECTIVE PRICING LEVEL: 1 OCT 99 COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	AUTHORIZ./BUDGET YEAR: 2000 EFFECT. PRICING LEVEL: 1 OCT 99 COST ($K)	CNTG ($K)	TOTAL ($K)	.........FULLY FUNDED ESTIMATE......... SPENT THRU FY 99 ($K)	COST ($K)	CNTG ($K)	FULL ($K)
11.3--	LEVEES AND FLOODWALLS GOVERNMENT FURNISH SERVICES	682	136	20%	818	682	136	818		759	151	910
08.3--	ROADS, & BRIDGES (WA DOT) GOVERNMENT FURNISH SERVICES									See Note Page 3		1,190
	TOTAL CONSTRUCTION COSTS ===>											2,100
01---	LANDS AND DAMAGES	136	27	20%	163	136	27	163		149	30	179
18---	CULTURAL RESOURCES											
21---	RECONNAISSANCE STUDIES											
22---	FEASIBILITY STUDIES											
30---	PLANNING, ENGINEERING & DESIGN	203	39	20%	242	203	39	242		221	41	262
31---	CONSTRUCTION MANAGEMENT	98	20	20%	118	98	20	118		110	22	132
	TOTAL ALL OTHER COSTS ========>	437	86	20%	523	437	86	523		480	93	573

TOTAL FEDERAL COSTS ==============> 1,737
TOTAL NON-FEDERAL COSTS ==========> 936
THE MAXIMUM PROJECT COST IS =======> $ 2,673

DISTRICT APPROVED DATE: ____/____/____

[illegible] Acting for CHIEF, COST ENGINEERING, Kim Callan 10/10/2

______ CHIEF, REAL ESTATE, Richard Carlton

______ CHIEF, PLANNING, Dennis Cannon

______ CHIEF, ENGINEERING, Surya Bhamidipaty

______ CHIEF, OPERATIONS, Wayne John

______ CHIEF, CONSTRUCTION, John Treadwell

______ CHIEF, CONTRACTING, Jackie Anderson

______ PROJECT MANAGER, Steven Fink

______ CHIEF, PM-PB, Donna Street

______ CHIEF, PPPMD, James Waddell

NOTE: Valid only when completely signed.

Walla Walla District

CONTRACT # 1

**** TOTAL CONTRACT COST SUMMARY ****

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE Section 205 Study - Quantities generated by InRoads., DATED: 23 NOV 99

PROJECT: Coppei Creek Flood Control Project Alternative 1, Revision #1
LOCATION: Waitsburg, WA

DISTRICT: Walla Walla
P.O.C.: KIM CALLAN, CHIEF, COST ENGINEERING

		CURRENT MCACES ESTIMATE PREPARED: 15 DEC 99 EFFECTIVE PRICING LEVEL: 1 OCT 99				AUTHORIZ./BUDGET YEAR: 2000 EFFECT. PRICING LEVEL: 1 OCT 99				........FULLY FUNDED ESTIMATE........				
ACCOUNT NUMBER	FEATURE DESCRIPTION	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	OMB (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	FEATURE MID PT	OMB (%)	COST ($K)	CNTG ($K)	FULL ($K)
11.3--	Coppei Creek Flood Control Project LEVEES AND FLOODWALLS Alternative 1 - Project consists of two levees and two retaining walls	682	136	20%	818		682	136	818	4 QTR 04	11.3%	759	151	910
	TOTAL CONSTRUCTION COSTS ===>	682	136	20%	818		682	136	818			759	151	910
01---	LANDS AND DAMAGES	136	27	20%	163		136	27	163	2 QTR 04	9.8%	149	30	179
22---	FEASIBILITY STUDIES													
30---	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	18	4	20%	22		18	4	22	3 QTR 03	7.6%	19	4	23
1.0%	Planning & Environmental Compliance	7	1	20%	8		7	1	8	3 QTR 03	7.6%	8	1	9
15.0%	Engineering & Design	106	21	20%	127		106	21	127	3 QTR 03	7.6%	114	23	137
1.0%	Engineering Tech Review & VE	7	1	20%	8		7	1	8	3 QTR 03	7.6%	8	1	9
1.0%	Contracting & Reprographics	7	1	20%	8		7	1	8	3 QTR 03	7.6%	8	1	9
3.0%	Engineering During Construction	21	4	20%	25		21	4	25	4 QTR 04	11.3%	23	4	27
1.0%	Project Operation:	7	1	20%	8		7	1	8	3 QTR 03	7.6%	8	1	9
31---	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	68	13	20%	81		68	13	81	4 QTR 04	11.3%	76	15	91
2.0%	Project Operation:	13	3	20%	16		13	3	16	4 QTR 04	11.3%	15	3	18
2.5%	Project Management	17	4	20%	21		17	4	21	4 QTR 04	11.3%	19	4	23
	TOTAL COSTS ================>	1,089	217	20%	1,305		1,089	216	1,305			1,206	238	1,444
06.2--	Coppei Creek Flood Control Project GOVERNMENT FURNISH MATERIALS													
30---	PLANNING, ENGINEERING & DESIGN													
15.0%	Engineering & Design													
1.0%	Contracting & Reprographics													
	TOTAL GFS COSTS =====>													
18---	MISC COSTS FOR ALL PROJECTS CULTURAL RESOURCES													
30---	MISC E & D COSTS - Surveys & Mapping	20	4	20%	24		20	4	24	4 QTR 04	11.3%	22	4	26
	MISC E & D COSTS-Explorations	10	2	20%	12		10	2	12	4 QTR 04	11.3%	11	2	13

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE Section 205 Study - Quantities generated by InRoads., DATED: 23 NOV 99

PROJECT: Coppei Creek Flood Control Project Alternative 1, Revision #1
LOCATION: Waitsburg, WA

DISTRICT: Walla Walla
P.O.C.: KIM CALLAN, CHIEF, COST ENGINEERING

		CURRENT MCACES ESTIMATE PREPARED: 15 DEC 99 EFFECTIVE PRICING LEVEL: 1 OCT 99				AUTHORIZ./BUDGET YEAR: 2000 EFFECT. PRICING LEVEL: 1 OCT 99				.........FULLY FUNDED ESTIMATE.........				
ACCOUNT NUMBER	FEATURE DESCRIPTION	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	OMB (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	FEATURE MID PT	OMB (%)	COST ($K)	CNTG ($K)	FULL ($K)
08.3--	Coppei Creek Flood Control Project ROADS, RAILROADS & BRIDGES Alternative 1 - Project consists replacing the existing bridge and modifying the approaches by the WA Department of Transportation									4QTR04				1,190
	TOTAL CONSTRUCTION COSTS ===>													
01--	LANDS AND DAMAGES													
22--	FEASIBILITY STUDIES													
30--	PLANNING, ENGINEERING & DESIGN Project Management Planning & Environmental Compliance Engineering & Design Engineering Tech Review & VE Contracting & Reprographics Engineering During Construction Project Operation:													
31--	CONSTRUCTION MANAGEMENT Construction Management Project Operation: Project Management													
	TOTAL COSTS ================>													
06.2--	Coppei Creek Flood Control Project GOVERNMENT FURNISH MATERIALS													
30--	PLANNING, ENGINEERING & DESIGN Engineering & Design Contracting & Reprographics													
	TOTAL GFS COSTS =====>													

Note: Total cost supplied by Washington State Department of Transportation (Mr. Leonard Pitman). Cost includes all contingencies and escalation.

Washington State Department of Transportation to do all design and construction on project as a reconstruction.

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE Section 205 Study - Quantities generated by InRoads., DATED: 23 NOV 99

PROJECT: Coppei Creek Flood Control Project Alternative 2, Revision #1
LOCATION: Waitsburg, WA

DISTRICT: Walla Walla
P.O.C.: KIM CALLAN, CHIEF, COST ENGINEERING

ACCOUNT NUMBER	FEATURE DESCRIPTION	CURRENT MCACES ESTIMATE PREPARED: 15 DEC 99, EFFECTIVE PRICING LEVEL: 1 OCT 99 COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	AUTHORIZ./BUDGET YEAR: 2000, EFFECT. PRICING LEVEL: 1 OCT 99 COST ($K)	CNTG ($K)	TOTAL ($K)	.........FULLY FUNDED ESTIMATE......... SPENT THRU FY 99 ($K)	COST ($K)	CNTG ($K)	FULL ($K)
11.3--	LEVEES AND FLOODWALLS GOVERNMENT FURNISH SERVICES	723	145	20%	868	723	145	868		804	161	965
08.3--	ROADS, & BRIDGES (WA DOT) GOVERNMENT FURNISH SERVICES									See Note Page 3		1,190
	TOTAL CONSTRUCTION COSTS ===>											2,155
01--	LANDS AND DAMAGES	136	27	20%	163	136	27	163		149	30	179
18--	CULTURAL RESOURCES											
21--	RECONNAISSANCE STUDIES											
22--	FEASIBILITY STUDIES											
30--	PLANNING, ENGINEERING & DESIGN	211	44	20%	255	211	44	255		230	47	277
31--	CONSTRUCTION MANAGEMENT	105	21	20%	126	105	21	126		117	23	140
	TOTAL ALL OTHER COSTS ========>	452	92	20%	544	452	92	544		496	100	596

TOTAL FEDERAL COSTS ==============> 1,788
TOTAL NON-FEDERAL COSTS ==========> 963
THE MAXIMUM PROJECT COST IS =======> $ 2,751

DISTRICT APPROVED:
DISTRICT APPROVED DATE: ___/___/___

[signature] Acting for CHIEF, COST ENGINEERING, Kim Callan 10/10/2
__________ CHIEF, REAL ESTATE, Richard Carlton
__________ CHIEF, PLANNING, Dennis Cannon
__________ CHIEF, ENGINEERING, Surya Bhamidipaty
__________ CHIEF, OPERATIONS, Wayne John
__________ CHIEF, CONSTRUCTION, John Treadwell
__________ CHIEF, CONTRACTING, Jackie Anderson
__________ PROJECT MANAGER, Steven Fink
__________ CHIEF, PM-PB, Donna Street
__________ CHIEF, PPPMD, James Waddell

NOTE: Valid only when completely signed.

Walla Walla District

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE Section 205 Study - Quantities generated by InRoads., DATED: 23 NOV 99

PROJECT: Coppei Creek Flood Control Project Alternative 2, Revision #1
LOCATION: Waitsburg, WA

DISTRICT: Walla Walla
P.O.C.: KIM CALLAN, CHIEF, COST ENGINEERING

		CURRENT MCACES ESTIMATE PREPARED: 15 DEC 99 EFFECTIVE PRICING LEVEL: 1 OCT 99				AUTHORIZ./BUDGET YEAR: 2000 EFFECT. PRICING LEVEL: 1 OCT 99				.........FULLY FUNDED ESTIMATE.........				
ACCOUNT NUMBER	FEATURE DESCRIPTION	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	OMB (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	FEATURE MID PT	OMB (%)	COST ($K)	CNTG ($K)	FULL ($K)
11.3--	Coppei Creek Flood Control Project LEVEES AND FLOODWALLS Alternative 1 - Project consists of two levees and two retaining walls	723	145	20%	868		723	145	868	4 QTR 04	11.3%	804	161	965
	TOTAL CONSTRUCTION COSTS ===>	723	145	20%	868		723	145	868			804	161	965
01---	LANDS AND DAMAGES	136	27	20%	163		136	27	163	2 QTR 04	9.8%	149	30	179
22---	FEASIBILITY STUDIES													
30---	PLANNING, ENGINEERING & DESIGN													
2.5%	Project Management	19	4	20%	23		19	4	23	3 QTR 03	7.6%	20	4	24
1.0%	Planning & Environmental Compliance	7	2	20%	9		7	2	9	3 QTR 03	7.6%	8	2	10
15.0%	Engineering & Design	112	22	20%	134		112	22	134	3 QTR 03	7.6%	121	24	145
1.0%	Engineering Tech Review & VE	7	2	20%	9		7	2	9	3 QTR 03	7.6%	8	2	10
1.0%	Contracting & Reprographics	7	2	20%	9		7	2	9	3 QTR 03	7.6%	8	2	10
3.0%	Engineering During Construction	22	4	20%	26		22	4	26	4 QTR 04	11.3%	24	5	29
1.0%	Project Operation:	7	2	20%	9		7	2	9	3 QTR 03	7.6%	8	2	10
31---	CONSTRUCTION MANAGEMENT													
10.0%	Construction Management	73	14	20%	87		73	14	87	4 QTR 04	11.3%	81	16	97
2.0%	Project Operation:	14	3	20%	17		14	3	17	4 QTR 04	11.3%	16	3	19
2.5%	Project Management	18	4	20%	22		18	4	22	4 QTR 04	11.3%	20	4	24
	TOTAL COSTS ================>	1,145	231	20%	1,376		1,145	231	1,376			1,267	255	1,522
06.2--	Coppei Creek Flood Control Project GOVERNMENT FURNISH MATERIALS													
30---	PLANNING, ENGINEERING & DESIGN													
15.0%	Engineering & Design													
1.0%	Contracting & Reprographics													
	TOTAL GFS COSTS =====>													
18---	MISC COSTS FOR ALL PROJECTS CULTURAL RESOURCES													
30---	MISC E & D COSTS - Surveys & Mapping	20	4	20%	24		20	4	24	4 QTR 04	11.3%	22	4	26
30---	MISC E & D COSTS-Explorations	10	2	20%	12		10	2	12	4 QTR 04	11.3%	11	2	13

THIS ESTIMATE IS BASED ON THE SCOPE CONTAINED IN THE Section 205 Study - Quantities generated by InRoads., DATED: 23 NOV 99

PROJECT: Coppei Creek Flood Control Project Alternative 2, Revision #1
LOCATION: Waitsburg, WA

DISTRICT: Walla Walla
P.O.C.: KIM CALLAN, CHIEF, COST ENGINEERING

		CURRENT MCACES ESTIMATE PREPARED: 15 DEC 99 EFFECTIVE PRICING LEVEL: 1 OCT 99				AUTHORIZ./BUDGET YEAR: 2000 EFFECT. PRICING LEVEL: 1 OCT 99				.........FULLY FUNDED ESTIMATE.........				
ACCOUNT NUMBER	FEATURE DESCRIPTION	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	OMB (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	FEATURE MID PT	OMB (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Coppei Creek Flood Control Project													
08.3--	ROADS, RAILROADS & BRIDGES									1QTR04				1,190
	Alternative 1 - Project consists replacing the existing bridge and modifying the approaches by the WA Department of Transportationby the WA Department of Transportation													
	TOTAL CONSTRUCTION COSTS ===>													1,190
01---	LANDS AND DAMAGES													
22---	FEASIBILITY STUDIES													
30---	PLANNING, ENGINEERING & DESIGN													
	Project Management													
	Planning & Environmental Compliance													
	Engineering & Design													
	Engineering Tech Review & VE													
	Contracting & Reprographics													
	Engineering During Construction													
	Project Operation:													
31---	CONSTRUCTION MANAGEMENT													
	Construction Management													
	Project Operation:													
	Project Management													
	TOTAL COSTS ================>													
	Coppei Creek Flood Control Project													
06.2--	GOVERNMENT FURNISH MATERIALS													
30---	PLANNING, ENGINEERING & DESIGN													
	Engineering & Design													
	Contracting & Reprographics													
	TOTAL GFS COSTS =====>													

Note: Total cost supplied by Washington State Department of Transportation (Mr. Leonard Pitman). Cost includes all contingencies and escalation.

Washington State Department of Transportation to do all design and construction on project as a reconstruction.

COPPEI CREEK Section 205 Study
Levee & Retaining Walls
Coppei Creek Waitsburg,WA
BASELINE ESTIMATE
--- FOR OFFICIAL USE ONLY ---

Designed By: NWW Engineering Division
Estimated By: John Skarbek

Prepared By: NWW-C, Cost Engineering Branch
Kim Callan, P.E., Branch Chief

Preparation Date: 12/15/99
Effective Date of Pricing: 10/01/99
Est Construction Time: 160 Days

Sales Tax: 7.90%

Currency in DOLLARS

LABOR ID: W99M15 EQUIP ID: NAT97C CREW ID: NAT99A UPB ID: UP99EA

** BASIS OF ESTIMATE **
This estimate is for a Section 205 Study for a Flood Control Project on Coppei Creek in Waitsburg, WA. It contains two alternatives.

** PROJECT DESCRIPTION **
The Project consists of two earthen levees (Levee 1 Alternative 1 is 2042 FT Levee 1 Alternative 2 is 2333 FT and Levee 2 Alternative 1 & 2 is 2000 FT) and two retaining walls (400 FT and 416 FT in each alternative). The work on the levees involves, clearing and grubbing the site, compacting the base, placing the earth levee, installing a geotextile fiber reinforcement mat on the waterward side and seeding the levee and staging areas. There are also three outbuildings within the alignment of the easternmost levee requiring demolition. The work on the retaining walls includes clearing and grubbing the area, excavating a trench, casting in place an 8'wide x 2' deep footing and an 8' tall x 1' wide concrete wall, backfilling the protected side with granular gravel fill and a topsoil layer, backfilling the waterward side with the excavated material, installing rip rap toe protection and seeding the area with grass.

The work described above is only a part of the entire project. In order for these levees/walls and alignments to work the bridge must be removed and replaced with a longer span to accommodate a wider channel. This work will bbe bid and completed by the Washington Department of Transportation (WA DOT). These costs are shown in the Total Project Cost Worksheet.

** BASIS OF DESIGN **
This estimate was prepared using the assumptions, tasks, quantities and information provided in a Memorandum to Steve Fink from Yvonne Gibbons detailing the quantities developed from the alignments using the Inroads computer program. The memorandum is dated November 23, 1999.

** CONSTRUCTION SCHEDULE **
The approximate construction schedule is as follows:

Advertise for bid	March 13, 2002
Award Contracts	April 14, 2002
Start Construction	June 14, 2002
Complete Construction	January 23, 2003

** CONSTRUCTION WINDOWS **
The in water work window for Coppei Creek is from August 15, 2002 through October 15, 2002.

** OVERTIME **
This estimate does not contain any overtime.

** ACQUISITION PLAN **
It is assumed that the contracts will be acquired through the bidding process.

** SUB-CONTRACTING PLAN **
This estimate uses one general contractor and no subcontractors.

** PROJECT CONSTRUCTION SITE ACCESS **
The project site is accessed via existing State and local roads.

** BORROW AREAS **
A borrow area is required for obtaining the granular gravel fill. It was assumed that this borrow area can be located within five miles of the project.

** CONSTRUCTION METHODOLOGY **
The methodology is standard.

** UNUSUAL CONDITION **
No unusual conditions are anticipated.

** UNIQUE TECHNIQUES OF CONSTRUCTION **
There are no unique techniques of construction.

** EQUIPMENT AND LABOR AVAILABILITY & DISTANCE TRAVELED **
Labor and Equipment are available within the Walla Walla, Tri-Cities area.

** ENVIRONMENTAL CONCERNS **
In-water work must occur within the construction window. The only portion of this work that may be within the water is the rip-rap toe protection along the retaining walls and the work performed by the WA DOT.

** EQUIPMENT, LABOR RATES, MATERIAL AND OTHER COSTS **

This estimate uses Davis Bacon labor rates for Walla Walla County, Washington. WA990001, Modification No 15 dated 11/05/99.

Equipment rates used are from EP 1110-1-8, Volume 8, September 1997.

Material prices were obtained from quotes, pricing guides, supply catalogs, and the MCACES National Unit Price Book UP99EB.

A 7.9% sales tax has been applied.

The effective price level is 1 October 1999 (FY 2000).

Parameter worksheets (displayed in link listings) are used throughout this estimate to calculate quantities in the detail line items. The worksheets use factors including swell and fill, material weight, efficiencies, haul distance, delay and wait times, equipment capacities, cycle times, haul speed, dump times and other miscellaneous factors where applicable.

Escalation and Contingencies are not included in the MCACES estimate but are addressed in the Total Project Cost Worksheet.

Tri-Service Automated Cost Engineering System (TRACES)
PROJECT COPPEI: COPPEI CREEK Section 205 Study - Levee & Retaining Walls
Coppei Creek Flood Control Project
** PROJECT INDIRECT SUMMARY - FEATURE **

	QUANTITY UOM	TOTAL DIRECT	FOOH	HOOH	PROF	OTHR	TAX	BOND	TOTAL COST	UNIT COST
A1 COPPEI CREEK ALTERNATIVE 1										
A1.11 LEVEES AND FLOODWALLS	4903.00 LF	506,956	76,043	30,899	57,584		0	10,072	681,555	139.01
TOTAL COPPEI CREEK ALTERNATIVE 1	4903.00 LF	506,956	76,043	30,899	57,584		0	10,072	681,555	139.01
A2 COPPEI CREEK ALTERNATIVE 2										
A2.11 LEVEES AND FLOODWALLS	5191.00 LF	543,375	76,072	32,211	61,126		0	10,692	723,476	139.37
TOTAL COPPEI CREEK ALTERNATIVE 2	5191.00 LF	543,375	76,072	32,211	61,126		0	10,692	723,476	139.37

LABOR ID: W99M15 EQUIP ID: NAT97C Currency in DOLLARS CREW ID: NAT99A UPB ID: UP99EA

	QUANTITY UOM	MHRS	LAB	EQUIP	MAT	OTHER	TOTAL COST	UNIT COST
A1 COPPEI CREEK ALTERNATIVE 1								
A1.11 LEVEES AND FLOODWALLS	4903.00 LF	5,992	198,431	132,846	173,677	2,002	506,956	103.40
TOTAL COPPEI CREEK ALTERNATIVE 1	4903.00 LF	5,992	198,431	132,846	173,677	2,002	506,956	103.40
% FIELD OFFICE OVERHEAD	15.00 %						76,043	
SUBTOTAL							583,000	
% HOME OFFICE OVERHEAD	5.30 %						30,899	
SUBTOTAL							613,899	
% PROFIT	9.38 %						57,584	
SUBTOTAL							671,482	
% BOND	1.50 %						10,072	
TOTAL INCL INDIRECTS							681,555	
A2 COPPEI CREEK ALTERNATIVE 2								
A2.11 LEVEES AND FLOODWALLS	5191.00 LF	6,392	211,994	154,952	174,427	2,002	543,375	104.68
TOTAL COPPEI CREEK ALTERNATIVE 2	5191.00 LF	6,392	211,994	154,952	174,427	2,002	543,375	104.68
% FIELD OFFICE OVERHEAD	14.00 %						76,072	
SUBTOTAL							619,447	
% HOME OFFICE OVERHEAD	5.20 %						32,211	
SUBTOTAL							651,659	
% PROFIT	9.38 %						61,126	
SUBTOTAL							712,784	
% BOND	1.50 %						10,692	
TOTAL INCL INDIRECTS							723,476	

DATE: 12/15/99
REVIEWED AND APPROVED

KIM C. CALLAN, P.E.
Chief, Cost Engineering Branch